

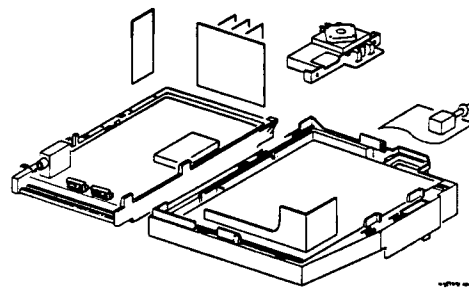
PHILIPS

32PW9534

MODEL

SERVICE MANUAL

Service
Service
Service



Service Manual

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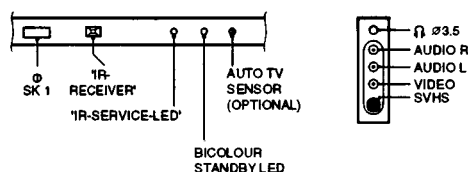


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- Mains voltage: 220V - 240V ($\pm 10\%$); 50-60Hz ($\pm 5\%$)
- Aerial input impedance: coaxial 75 Ω
- Minimal aerial voltage: 30 μ V (VHF), 40 μ V (UHF)
- Maximum aerial voltage: 180 mV
- Programmes: 0-99
- VCR programmes: 0, 90-99

2.1 Front connections

TOP CONTROL FL7/FL8 STYLING



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Figure 2-1

2.1.1 Audio/Video

Video 1Vpp/75Ω
Audio L(0.5Vrms ≥10kΩ)
Audio R(0.5Vrms ≥10kΩ)



Headphone (32-600Ω ≥10mW)



2.1.2 SVHS

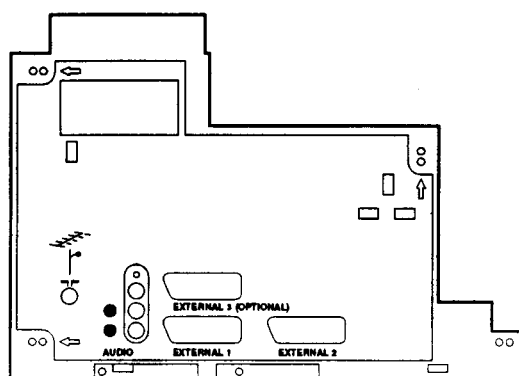
1-
2-
3- Y (1Vpp; 75Ω)
4- C (0.3 Vpp;75Ω)



2.2 Rear connections

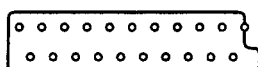
See figure 2.2

2.2.1 External 1(in/out): RGB+CVBS

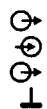


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Figure 2-2



1- Audio R (0.5Vrms ≤1kΩ)
2- Audio R (0.5Vrms ≥10kΩ)
3- Audio L (0.5Vrms ≤1kΩ)
4- Audio



5- Blue
6- Audio L (0.5Vrms ≥10kΩ)
7- Blue (0.7Vpp/75Ω)
8- CVBS-status
0-1.3V:INT



4.5-7V:EXT 16:9

9.5-12V:EXT 4:3

9- Green
10-
11- Green (0.7Vpp/75Ω)
12-
13- Red
14- RGB-status
15- Red (0.7Vpp/75Ω)
16- RGB-status
0-0.4V:INT

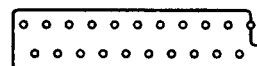


1-3V:EXT/75Ω

17- CVBS
18- CVBS
19- CVBS (1Vpp/75Ω)
20- CVBS (1Vpp/75Ω)
21- Earth socket



2.2.2 External 2 (in/out): SVHS+RGB+CVBS (intended for VCR.)



1- Audio R (0.5Vrms ≤1kΩ)
2- Audio R (0.5Vrms ≥10kΩ)
3- Audio L (0.5Vrms ≤1kΩ)
4- Audio
5- Blue
6- Audio L (0.5Vrms ≥10kΩ)
7- Blue / Chroma out
(0.7Vpp/75Ω)
8- CVBS-status
0-1.3V:INT



4.5-7V:EXT 16:9

9.5-12V:EXT 4:3

9- Green
10- Easy link
11- Green (0.7Vpp/75Ω)
12-
13- Red
14- RGB-status
15- Red / chroma-in
(0.7Vpp/75Ω)
16- RGB-status
(0-0.4V:INT



1-3V:EXT/75Ω)

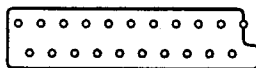
17- CVBS
18- CVBS
19- Y/CVBS (1Vpp/75Ω)
20- Y/CVBS (1Vpp/75Ω)
21- Earth socket



2.2.3 External 3 (in): CVBS+Audio (optional)

4.5-7V:EXT 16:9

9.5-12V:EXT 4:3



- 1 -
 2- Audio R ($0.5V_{rms} > 10k\Omega$)
 3-
 4- Audio
 5-
 6- Audio L ($0.5V_{rms} > 10k\Omega$)
 7-
 8- CVBS-status 0-1.3V:INT



- 9-
 10-
 11-
 12-
 13-
 14-
 15-
 16-
 17- CVBS
 18- CVBS
 19-
 20- CVBS ($1V_{pp}/75\Omega$)
 21- Earth socket

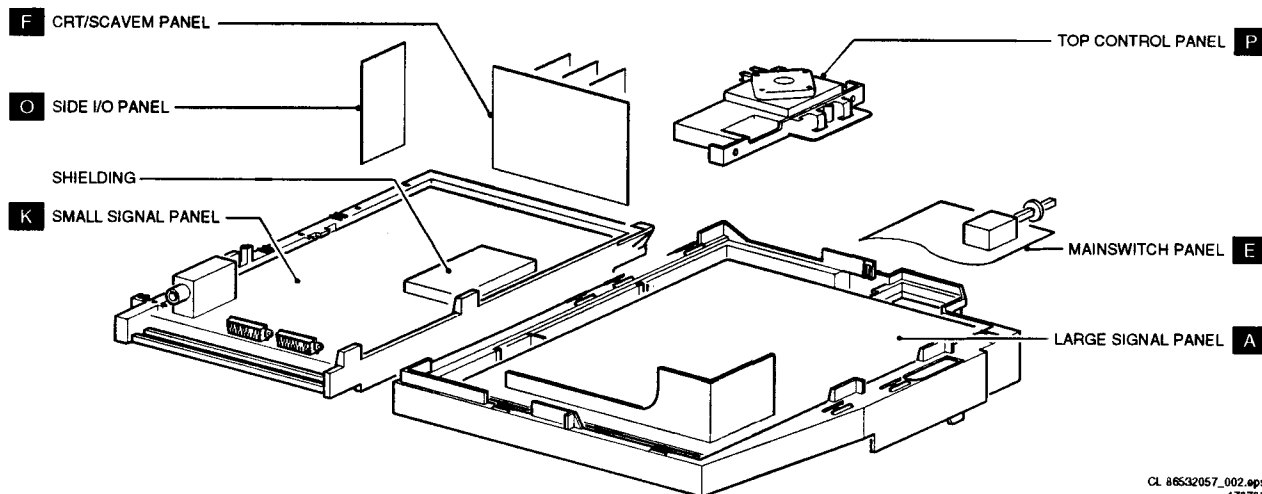


Figure 2-3

3.1 Safety instructions for repairs



Safety regulations require that during a repair:

- the set should be connected to the mains via an isolating transformer;
- safety components, indicated by the symbol Δ , should be replaced by components identical to the original ones;
- when replacing the CRT, safety goggles must be worn.

2. Safety regulations require that after a repair the set must be returned in its original condition. In particular attention should be paid to the following points. h

- As a strict precaution, we advise you to resolder the solder joints through which the horizontal deflection current is flowing, in particular: ('general repair instruction')
 - all pins of the line output transformer (LOT);
 - fly-back capacitor(s);
 - S-correction capacitor(s);
 - line output transistor;
 - pins of the connector with wires to the deflection coil;
 - other components through which the deflection current flows.

Note:

This resoldering is advised to prevent bad connections due to metal fatigue in solder joints and is therefore only necessary for television sets older than 2 years.

The wire trees and EHT cable should be routed correctly and fixed with the mounted cable clamps. The insulation of the mains lead should be checked for external damage.

The mains lead strain relief should be checked for its function in order to avoid touching the CRT, hot components or heat sinks.

The electrical DC resistance between the mains plug and the secondary side should be checked (only for sets which have a mains isolated power supply). This check can be done as follows:

- unplug the mains cord and connect a wire between the two pins of the mains plug;
- set the mains switch to the on position (keep the mains cord unplugged!);
- measure the resistance value between the pins of the mains plug and the metal shielding of the tuner or the aerial connection on the set. The reading should be between 4.5 MW and 12 MW;
- switch off the TV and remove the wire between the two pins of the mains plug.

The cabinet should be checked for defects to avoid touching of any inner parts by the customer.

3.2 Maintenance instruction

It is recommended to have a maintenance inspection carried out by a qualified service employee. The interval depends on the usage conditions:

- When the set is used under normal circumstances, for example in a living room, the recommended interval is 3 to 5 years.
- When the set is used in circumstances with higher dust, grease or moisture levels, for example in a kitchen, the recommended interval is 1 year.
- The maintenance inspection contains the following actions:
 - Execute the above mentioned 'general repair instruction'.
 - Clean the power supply and deflection circuitry on the chassis.
 - Clean the picture tube panel and the neck of the picture tube.

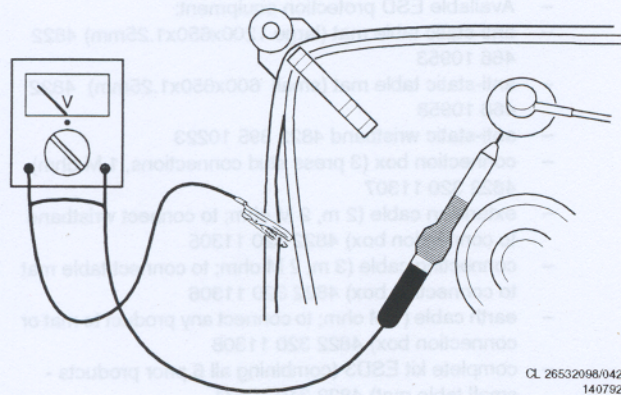
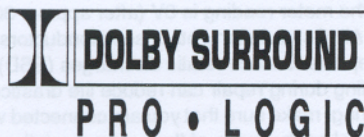
3.3 Warnings



1. In order to prevent damage to ICs and transistors, all high-voltage flashovers must be avoided. In order to prevent damage to the picture tube, the method shown in Fig. 3.1 should be used to discharge the picture tube. Use a high-voltage probe and a multimeter (position DC-V). Discharge until the meter reading is 0V (after approx. 30s).
2. ESD All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically. When repairing, make sure that you are connected with the same potential as the mass of the set by a wristband with resistance. Keep components and tools also at this same potential.
 - Available ESD protection equipment:
 - anti-static table mat (large 1200x650x1.25mm) 4822 466 10953
 - anti-static table mat (small 600x650x1.25mm) 4822 466 10958
 - anti-static wristband 4822 395 10223
 - connection box (3 press stud connections, 1 M ohm) 4822 320 11307
 - extension cable (2 m, 2 M ohm; to connect wristband to connection box) 4822 320 11305
 - connecting cable (3 m, 2 M ohm; to connect table mat to connection box) 4822 320 11306
 - earth cable (1 M ohm; to connect any product to mat or connection box) 4822 320 11308
 - complete kit ESD3 (combining all 6 prior products - small table mat) 4822 310 10671
 - wristband tester 4822 344 13999
3. Together with the deflection unit and any multipole unit, the flat square picture tubes used from an integrated unit. The deflection and the multipole units are set optimally at the factory. Adjustment of this unit during repair is therefore not recommended.
4. Be careful during measurements in the high-voltage section and on the picture tube.
5. Never replace modules or other components while the unit is switched on.
6. When making settings, use plastic rather than metal tools. This will prevent any short circuits and the danger of a circuit becoming unstable.
7. Wear safety goggles during replacement of the picture tube

3.4 Notes

1. The direct voltages and oscillograms should be measured with regard to the tuner earth (⏏), or hot earth (⏏) as this is called.
2. The direct voltages and oscillograms shown in the diagrams are indicative and should be measured in the Service Default Mode (see chapter 5) with a colour bar signal and stereo sound (L:3 kHz, R:1 kHz unless stated otherwise) and picture carrier at 475.25 MHz.
3. Where necessary, the oscillograms and direct voltages are measured with (⏏) and without aerial signal (⏏). Voltages in the power supply section are measured both for normal operation (⏏) and in standby (⏏). These values are indicated by means of the appropriate symbols.
4. The picture tube PWB has printed spark gaps. Each spark gap is connected between an electrode of the picture tube and the Aquadag coating.
5. The semiconductors indicated in the circuit diagram and in the parts lists are completely interchangeable per position with the semiconductors in the unit, irrespective of the type indication on these semiconductors.
6. Manufactured under license from Dolby Laboratories Licensing Corporation.
7. DOLBY, the double D symbol and PRO LOGIC are trademarks of Dolby Laboratories Licensing Corporation.



4.1 Removing the rear cover

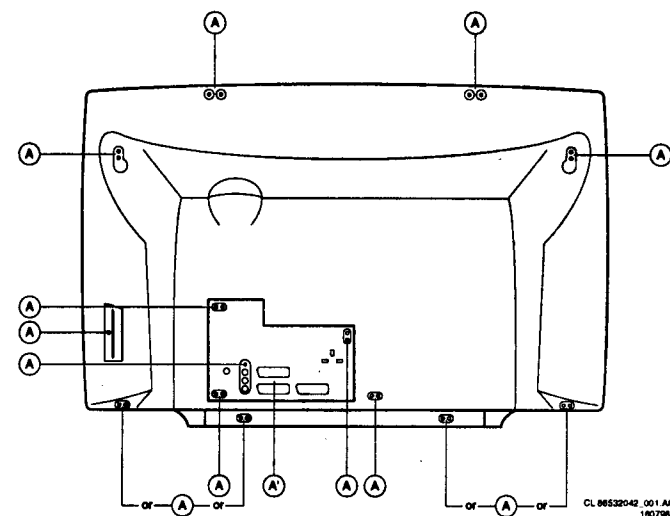


Figure 4-1

1. Remove the fixation screws (A) of the rear cover, notice also the side-I/O-screw; see figure 4.1 (A') screw only valid for 3-scant configuration.
2. Remove the rear cover.

4.2 Service positions

There are two predefined service positions

1. Service position for the top side (component-side)
2. Service position for the bottom side (only valid for LSP) (copper-side)

4.2.1 Service position top side

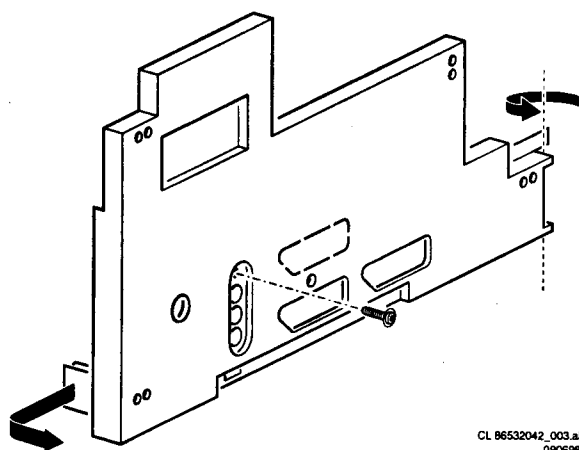


Figure 4-2

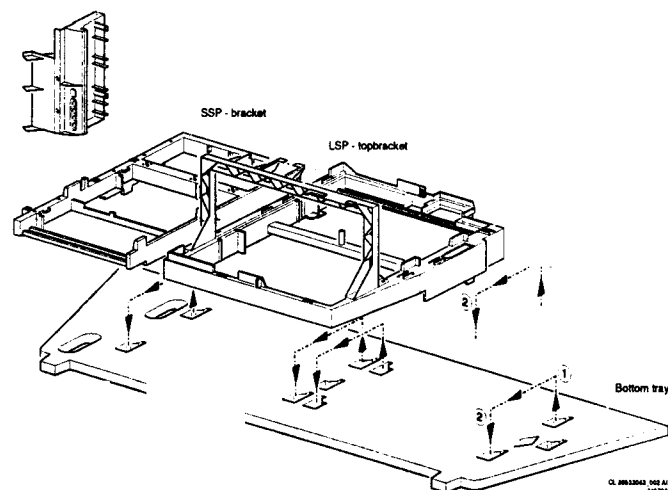


Figure 4-3

1. Remove 1 screw in case of 2-scant I/O-backplate and 2 screws in case of a 3-scant I/O-backplate. (See figure 4.2)
2. Remove I/O-backplate by releasing snap at left side. Pull to left and backwards. The I/O-bracket hinges at the right side. It can be removed now.
3. Pull backwards (about 8 cm) the bracket with the SSP and the LSP. These brackets are not fixed to each other, but can be repositioned backwards, as if they were one bracket.
4. Hook the brackets in the first row of fixation-holes of the bottom tray; see figure 4.3. In other words re-position the fixation from (1) TO (2)

4.2.2 Service position bottom side (only for LSP)

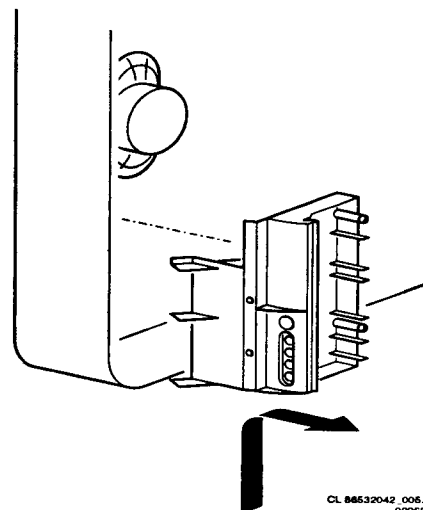


Figure 4-4

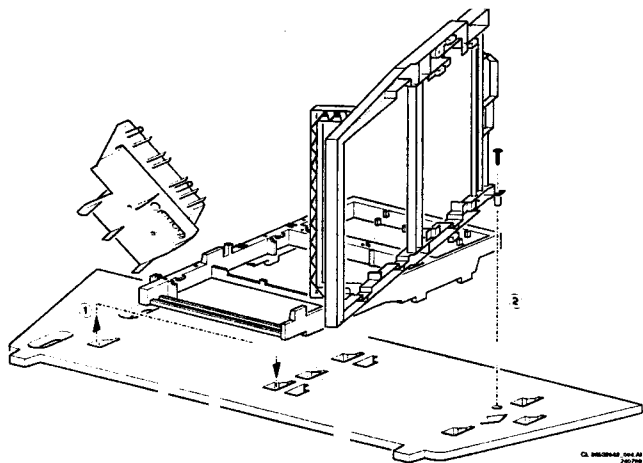


Figure 4-5

1. Referring to previous Service position one must remove the SSP and LSP from bottom tray by pulling back these two panels.
2. Disconnect the SSP from the LSP bracket
3. The two panels must be shifted some 25 cm to the right. When doing this the side-assembly can be taken out of the hinge (see figure 4.4), and placed on the bottom tray.
4. Either the LSP-topbracket must be removed first, or the cabling from SSP to LSP (O310 and O311) must be re-routed outside the LSP-topbracket to get room to position these panels
5. Turn the LSP 90 degrees anti clock wise and place the LSP in the hole of the bottom tray. If needed a screw can reinforce the stability of this position. (see figure 4.5) (See (2)).
6. The left front hook of the SSP panel can be fixed in a fixation-hole, that was used in previous service-position for the right front hook of the SSP. See described movement-action (1). (there is no right fixation hole)

4.2.3 (Service position bottom side SSP)

1. In fact there is no service position for the bottom of the SSP. Almost all components are present on the component-side. All test points are located on the component-side.
2. If ICs must be replaced take the complete panel out. If still a service-position is needed take SSP out of bracket and rotate it so that one (sitting behind the set) sees the copper-side of the SSP, with Tuner pointed to the upper-side.

4.3 Removing the LSP-top bracket

1. (See figure 4.3). Remove the two fixation screws of the LSP-topbracket (one on the left hand side, one on the right hand side)
2. Disconnect wirings from cable-clamps of LSP-topbracket
3. In case the line transformer is changed by a bigger type a part of the LSP-topbracket can be removed by breaking it

4.4 Removing the SSP from SSP-bracket

1. Release the three fixation clamps on the right hand side of the bracket
2. Press the board upwards and remove the board from the bracket

4.5 Removing the LSP from LSP-bracket

1. Release the two fixation clamps on the right hand side of the bracket
2. Press the board upwards and remove the board from the bracket

4.6 Removing the top control board

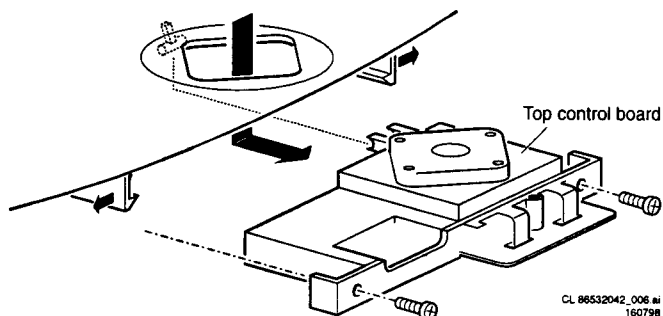


Figure 4-6

1. See figure 4.6. Pull 2 clamps to the outer side
2. Top control board can be pushed down now, while it hinges still in the front
3. Now the board can be pulled backwards
4. (If by accident the hinge in front is damaged or one of the clamps is broken, the top control board can also be fixed by 2 screws)

4.7 Removing the side I/O board

1. The complete Side I/O-assembly can be lifted out of the hinges and placed on the bottom tray of the set. (see fig 4.3)
2. The pcb can easily be removed out of the bracket by releasing the fixation clamps

4.8 Removing the mains switch/LED board

1. Release the two fixation clamps
2. Pull the board backwards

4.9 Mounting the rear cover

Before mounting the rear cover, check whether the mains cord is mounted correctly in the guiding brackets

In this chapter the following paragraphs are included:

- 5.1 Test points
- 5.2 Service modes, Dealer Service Tool and ComPair (including fault finding tips related to CSM-mode)
- 5.3 Error codes
- 5.4 Protections
- 5.5 Fault find tree

5.1 Test points

The MG2.1E chassis is equipped with test points in the service printing. These test points are referring to the functional blocks:

P1-P2-P3, etc: Test points for the power supply
 L1-L2-L3, etc: Test points for the line drive and line output circuitry
 F1-F2-F3, etc on Small Signal Panel: Test points for the frame drive
 F1-F2-F3, etc. on CRT/Scavem Panel: Test points for the CRT-panel circuitry
 F1-F2-F3, etc. on Large Small Signal Panel: Test points for the frame output circuitry,
 S1-S2-S3, etc: Test points for the synchronisation circuitry
 V1-V2-V3, etc: Test points for the video processing circuitry
 I1-I2-I3, etc: Test points for the Tuner/IF part
 A1-A2-A3, etc. on Small Signal Panel: Test points for the audio processing circuitry
 A1-A2-A3, etc. on Large Signal Panel: Test points for the audio amplifiers
 C1-C2-C3, etc: Test points for the control circuitry
 T1-T2-T3, etc: Testpoints for the teletext circuitry
 SC1-SC2-SC3, etc: Test points for the Scavem circuitry

The numbering is done in a for diagnostics logical sequence; always start diagnosing within a functional block in the sequence of the relevant test points for that functional block.

5.2 Service modes, Dealer Service Tool and ComPair

For easy installation and diagnosis the dealer remote control RC7150 is introduced. The RC7150 can be used for all new TV sets, including all set of the MG2.1E chassis. The RC7150 is also called Dealer Service Tool or DST. The ordering number of the DST (RC7150) is 4822 218 21232.

Installation features for the dealer

The dealer can use the RC7150 for programming the TV-set with presets.

10 Different program tables can be programmed into the DST via a TV-set (downloading from the GFL, MD2 or MG2.1 to the DST; see GFL, MD2 and MG2.1 service manuals) or by the DST-I (DST interface; ordering code 4822 218 21277).

For explanation of the installation features of the DST, the directions for use of the DST (4822 727 20073) are recommended (For the MG2.1E chassis, download code 4 should be used).

Diagnose features for the servicer

The MG2.1E sets can be put in the two service modes via the DST RC7150. These are the Service Default Mode (SDM) and the Service Alignment Mode (SAM).

The SDM and SAM can also be entered by short circuiting the relevant pins on the SSP.

Service Default Mode (SDM)

Specification of the SDM:

- Tuning frequency 475.25 MHz
- TV-system for BGLM set to BG, for BGLL'I sets to LL'
- All picture settings at 50% (brightness, colour, contrast, HUE)
- All sound settings at 50% except volume at 25% (so bass, treble, balance at 50%, volume at 25%)
- All service-unfriendly modes are disabled (like sleep timer, child lock, blue mute)

Entering the SDM can be done in 2 ways:

- By the "DEFAULT" key on the DST while the set is in the normal operation mode.
- By shortcircuiting for a moment the two pins (pin 2 and 3 of connector 0356) on the component side of the SSP with the indication "SDM" (activation can be performed in all modes except when the set has a problem with the main-processor).

Note: If the SDM is entered via the pins, all the protections are de-activated.

Exiting the SDM can only be done via the STANDBY command. By switching off-on the set with the mains switch the MG2.1E will come up again in the SDM.

Service Alignment Mode (SAM)

Specification of the SAM:

- Software alignments (see chapter 8)
- Option settings (see chapter 8)
- Error buffer reading and erasing. The most recent error code is displayed on the left side.
- Operation counter
- Software version

Entering the SAM can be done in 2 ways:

- By the > button on the DST while the set is in the normal operation mode (or SDM). Enter the password '3-1-4-0' and press OK.
- By shortcircuiting for a moment the two pins (pin 1 and 2 of connector 0356) on the component side of the SSP with the indication "SAM" (activation can be performed in all modes except when the set has a problem with the microprocessor).

Note: If the SAM is entered via the pins, all protections are de-activated.

Exiting the SAM can be done via the MENU command or via switching off-on the set with the mains switch.

Customer Service Mode (CSM)

All MG2.1E sets are equipped with the 'Customer Service Mode' (CSM). This 'Customer Service Mode' (CSM) is a special service mode which can be activated and deactivated by the customer upon request of the service technician/dealer during a telephone conversation in order to identify the status of the set. This CSM is a 'read only' mode, therefore modifications in this mode are not possible.

Switching-on of the Customer Service Mode

The Customer Service Mode will switch-on after pressing simultaneously the "MUTE" knob on the remote control handset and the "MENU" button on the TV for at least 4

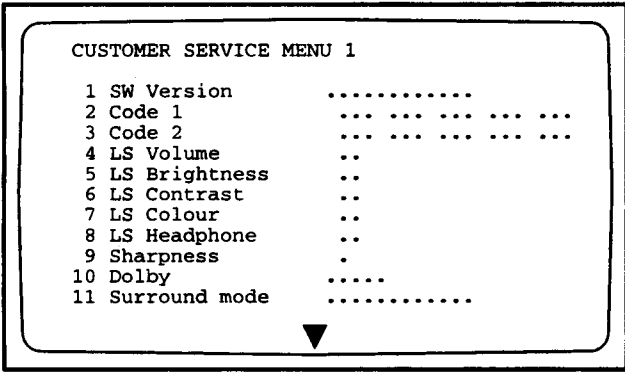
seconds. This activation only works if there is no menu on the screen.

Switching-off the Customer Service Mode

The Customer Service Mode will switch-off after pressing any key of the remote control handset (with exception of the 'cursor-up' and 'cursor-down' keys, or the buttons on the TV or by switching off the TV set with the mains switch.

Detailed explanation of the Customer service Mode

After switching on the Customer Service Menu the following screen will appear:



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Figure 5-1 Customer Service Menu 1

Line 1: Software version; the build in software version AAAA= MG21(chassis name) B= E (Europe) C= 1 (language cluster) X = main version number Y = sub version number Details on the software version can be found in the chapter "Software Survey" of the publication "Product Survey - Colour Television".

Line 2: Code 1; gives the last 5 errors of the error buffer. As soon as the built-in diagnose software has detected an error the buffer is adapted.

Line 3: Code 2; gives the first 5 errors of the error buffer. As soon as the built-in diagnose software has detected an error the buffer is adapted. The last occurred error is displayed on the leftmost position of code 2. Each error code is displayed as a 3 digit number. When less than 10 errors occur, the rest of the line(s) is(are) empty. In case of no errors the text "No Errors" is displayed. See paragraph 5.3 of this chapter for a description of the error codes.

Line 4: LS Volume; gives the Last Status of the volume as set by the customer for this selected transmitter. Volume values can be changed via the volume key on the remote control handset.

Line 5: LS Brightness; gives the Last Status of the brightness as set by the customer for this selected transmitter. Brightness values can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after pressing the red button for picture menu and selecting "brightness".

Line 6: LS Contrast; gives the Last Status of the contrast as set by the customer. The value can vary from 0 (contrast is minimum) to 63 (contrast is maximum). Contrast values can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after pressing the red button for picture menu and selecting "contrast".

Line 7: LS Colour; gives the Last Status of the colour saturation, as set by the customer. The value can vary from 0

(colour is minimum) to 63 (colour is maximum). Colour values can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after pressing the red button for picture menu and selecting "colour".

Line 8: LS Headphone; gives the Last Status of the headphone volume, as set by the customer. The value can vary from 0 (volume is minimum) to 63 (volume is maximum). Headphone volume values can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after pressing the green button for sound menu and selecting "headphone".

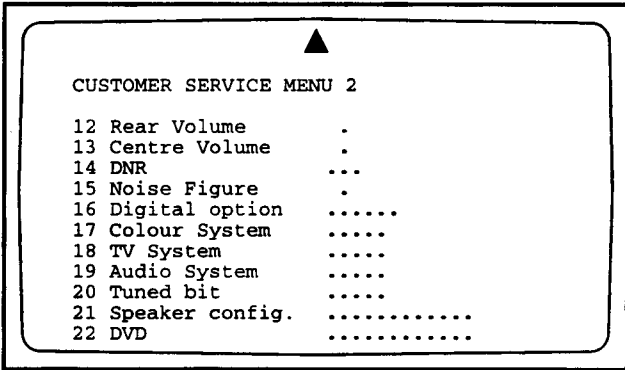
Line 9: Sharpness; gives the sharpness value. The value can vary from 0 (sharpness is minimum) to 4 (sharpness is maximum). In case of bad antenna signals a too high value of the sharpness can result in a noisy picture. Sharpness values can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after pressing the red button for picture menu and selecting "sharpness".

Line 10: Dolby; indicates whether the received transmitter transmits Dolby sound (present) or not (not present). Attention: The presence of Dolby can only be tested by the software on the Dolby Signalling bit. If a Dolby transmission is therefore received without a Dolby Signalling bit, then this indicator will show "not present" even though such a Dolby transmission is received.

Line 11: Surround Mode; indicates the by the customer selected surround mode. In case the set is a Non-dolby set there will be displayed "0". If it is a Dolby-set then is displayed: "Pro Logic", "Dolby 3 Stereo", "Hall" or "Off". For Dolby-set surround mode can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after pressing the green button for sound menu and selecting "Surround settings".

By means of the 'cursor-down' knob on the remote control handset the Customer Service Menu 2 will appear. By means of the 'cursor-up' knob on the remote control handset the Customer Service Menu 1 will appear again.

Customer Service Menu 2 represents following information:



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230798

Figure 5-2 Customer Service Menu 2

Line 12: Rear Volume; gives the volume value of the surround sound loudspeakers. This value can vary from 0 (minimum volume) to 63 (maximum volume). Rear volume can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after pressing the green button for sound menu, selecting "Surround settings" and selecting "Rear volume". This feature is only available when surround mode is in "Dolby Pro Logic" or "Hall".

Line 13: Centre Volume; gives the volume value of the centre loudspeakers. This value can vary from 0 (minimum volume) to 63 (maximum volume). Centre volume can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after pressing the green button for sound menu, selecting 'Dolby Pro Logic' and selecting "centre volume". This feature is only available when surround mode is in "Dolby Pro Logic" or "Dolby 3 Stereo".

Line 14: DNR (Dynamic Noise Reduction); gives the setting of the DNR for the selected transmitter. The following selections are possible:

"off", "min", "med" or "max"
 "off" or "automatic" (MG2.1E with "Automatic Noise Reduction").

The DNR can be changed via the "DNR" key on the remote control handset.

Line 15: Noise Figure; gives the selected noise ratio for this selected transmitter. This value can vary from 0-2 (good signal) to 4-5 (average signal) and to 7 or higher (bad signal). This only works in case the DNR selection is "off/automatic".

Line 16: Digital Option; gives the selected digital mode, "100Hz", Digital Scan" or "Natural Motion". Digital option can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after pressing the red button for picture menu and selecting "digital options".

Line 17: Colour System; gives information about the colour system of the selected transmitter.

Black and white: no colour carrier received
 PAL: PAL signal received
 SECAM: SECAM signal received
 NTSC: NTSC signal received

Line 18: TV System; gives information about the video system of the selected transmitter.

- BG: BG signal received
- DK: DK signal received
- I: PAL I signal received
- L: SECAM L signals received
- M38.9: NTSC M signal received with video carrier on 38.9 MHz
- MN: NTSC M signal received

Line 19: Audio System; gives information about the audio system of the selected transmitter.

- Sound Muted: No sound
- Dolby Pro Logic: Dolby Pro Logic sound received
- Mono: Mono sound received
- Stereo: Stereo sound received
- Dual I: Language I received
- Dual II: Language II received
- Digital Mono: Digital mono sound is received
- Digital Stereo: Digital stereo sound is received
- Digital Dual I: Digital language I is received
- Digital Dual II: Digital language II is received

Line 20: Tuned Bit; gives information about the tuning method of the stored preset. If the value is "Yes" the preset is stored via manual entry of the frequency when a transmitter was not present on that frequency. In that case the TV will attempt to perform a micro-search every time the preset number is selected. Once the micro-search has been successful the Tuned Bit will be set to "No".

Line 21: Speaker configuration; gives the configuration setting for the speakers.

In case the set is a Non-dolby set there will be displayed "0". If it is a Dolby-set then is displayed:

"Full internal", "L/R external", "Surround external" or "Full external". For the Dolby-set the speaker configuration can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after opening the installation menu and selecting "set up". The installation menu can be opened by pressing 'timer' and 'enlarge' at the same time. This feature is only available when the set has virtual Dolby.

Line 22: DVD; gives the configuration setting for DVD. This can be "Present" or "Not Present". If "Present" is selected the starting point is a top quality signal and a number of settings are therefore changed automatically. DVD can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after opening the installation menu and selecting "set up". The installation menu can be opened by pressing 'timer' and 'enlarge' at the same time.

Problems and solving tips

The procedures to change the value or the status of the different settings is described in the paragraph 'Detailed explanation of the Customer Service Mode'

Picture problems

Worse picture quality in case of DVD pictures Check line 22 "DVD". In case line 22 gives the indication "Not Present" change the setting into "Present".

Snowy/noisy picture

1. Check line 15 "Noise Figure". In case the value is 7 or higher and the value is also high on other programs check the aerial cable / aerial system.
2. Check lines 9 "Sharpness", 14 "DNR" and 15 "Noise Figure". In case the value of line 9 is 3 or 4 and the value of line 15 is high (7 or higher), lower the value of line 9 "sharpness" and switch DNR (line 14) to "automatic", "on" or to a higher value.

Picture too dark

1. Press "Smart Picture" button on the Remote Control handset. In case picture improves, raise the brightness value or raise the contrast value. The new value(s) are automatically stored for all TV channels.
2. After switching on the Customer Service Mode the picture is OK. Raise the brightness value or raise the contrast value. The new value(s) are automatically stored for all TV channels.
3. Check lines 6 "PP Brightness" and 7 "PP Contrast". The value of line 6 is low (<10) or the value of line 7 is low (<10). Raise the brightness value or raise the contrast value.

Picture too bright

1. Press "Smart Picture" button on the Remote Control handset. In case picture improves, reduce the brightness value or reduce the contrast value. The new value(s) are automatically stored for all TV channels.
2. After switching on the Customer service Mode the picture is OK. Reduce the brightness value or reduce the contrast value. The new value(s) are automatically stored for all TV channels.
3. Check lines 6 "PP Brightness" and 7 "PP Contrast". The value of line 6 is high (>40) or the value of line 7 is high (>50). Reduce the brightness value or raise the contrast value.

Fading picture

Digital scan effect. Check line 14 "DNR". The status of "DNR" is 'med' or 'max'. Reduce "DNR" to 'min' or switch off the digital scan.

White line around picture elements and text

1. Press "Smart Picture" button on the Remote Control handset. In case picture improves, reduce the sharpness value. The new value(s) are automatically stored for all TV channels.
2. After switching on the Customer service Mode the picture is OK. Reduce the sharpness value. The new value(s) are automatically stored for all TV channels.
3. Check lines Check line 8 "Sharpness". Reduce the sharpness value. The new value(s) are automatically stored for all TV channels

No picture Check line 20 "Tuned bit". In case the value is 'Yes', install the required program again. Open the installation menu by pressing 'timer' and 'enlarge' at the same time and perform manual installation.

Blue picture No proper signal is received. Check the aerial cable/aerial system.

Blue picture and/or unstable picture A scrambled or decoded signal is received

Black and white picture Check line 5 "PP colour". In case the value is low (<10) raise the value of colour. The new value(s) are automatically stored for all TV channels.

No colours/colour lines around picture elements

1. Check lines 17 "Colour System" and 18 "TV System". In case line 17 is 'PAL' and line 18 is 'M 38,9', the installed system for this preset is 'USA', while 'West Europe' is required. Install the required program again. Open the installation menu by pressing 'timer' and 'enlarge' at the same time and perform manual installation. Select 'System; West Europe'.
2. In case line 17 is 'PAL' and line 18 is 'L', the installed system for this preset is 'France', while 'West Europe' is required. Install the required program again. Open the installation menu by pressing 'timer' and 'enlarge' at the same time and perform manual installation. Select 'System; West Europe'

No colours/noise in picture

1. Check lines 17 "Colour System" and 18 "TV System". In case line 17 is 'Black and White' and line 18 is 'BG', the installed system for this preset is 'West Europe', while 'USA' is required. Install the required program again. Open the installation menu by pressing 'timer' and 'enlarge' at the same time and perform manual installation. Select 'System; USA'.
2. In case line 17 is 'Black and White' and line 18 is 'L', the installed system for this preset is 'France', while 'USA' is required. Install the required program again. Open the installation menu by pressing 'timer' and 'enlarge' at the same time and perform manual installation. Select 'System; USA'

Colours not correct Check lines 17 "Colour System" and 18 "TV System". In case line 17 is 'PAL' and line 18 is 'L', the installed system for this preset is 'France', while 'West Europe' is required. Install the required program again. Open the installation menu by pressing 'timer' and 'enlarge' at the same time and perform manual installation. Select 'System; West Europe'.

Colours not correct/unstable picture Check lines 17 "Colour System" and 18 "TV System". In case line 17 is 'SECAM' and line 18 is 'BG', the installed system for this preset is 'USA', while 'France' is required. Install the required program again. Open the installation menu by pressing 'timer' and 'enlarge' at the same time and perform manual installation. Select 'System; France'.

Unstable picture Check lines 17 "Colour System" and 18 "TV System". In case line 17 is 'SECAM' and line 18 is 'M 38,9', the installed system for this preset is 'West Europe', while 'France' is required. Install the required program again. Open the installation menu by pressing 'timer' and 'enlarge' at the same time and perform manual installation. Select 'System; France'.

Menu text not sharp enough

1. Press "Smart Picture" button on the Remote Control handset. In case picture improves, reduce the contrast value. The new value(s) are automatically stored for all TV channels.
2. After switching on the Customer Service Mode the picture is OK. Reduce the contrast value. The new value(s) are automatically stored for all TV channels.
3. Check line 7 "PP Contrast". The value of line 7 is high (>50). Reduce the contrast value.

Sound problems**No sound from left and right speaker**

1. Press "Smart Sound" button on the Remote Control handset. In case sound improves, raise the volume value. The new value(s) are automatically stored for all TV channels.
2. After switching on the Customer Service Mode the volume is OK. Raise the volume value. The new value(s) are automatically stored for all TV channels.
3. Check line 4 "PP Volume". The value is low. Raise the value of "PP Volume". The new value(s) are automatically stored for all TV channels.

Sound too loud for left and right speaker

1. Press "Smart Sound" button on the Remote Control handset. In case sound improves, reduce the volume value. The new value(s) are automatically stored for all TV channels.
2. After switching on the Customer Service Mode the volume is OK. Reduce the volume value. The new value(s) are automatically stored for all TV channels.
3. Check line 4 "PP Volume". The value is high. Reduce the value of "PP Volume". The new value(s) are automatically stored for all TV channels.

No sound from "centre" speaker Check line 12 "Centre Volume". The value is low. Raise the value of the "Centre Volume"

Sound too loud from "centre" speaker Check line 12 "Centre Volume". The value is high. Reduce the value of the "Centre Volume"

Diagnose Mode (only active during transmission of error codes and diagnose 99)

This mode is activated by the DIAGNOSE command on the DST for reading the error codes and erasing the error buffer by the DST even when the set is in protection and so there is no picture (assuming that the power supply and the control part are working). For activation see paragraph 5.3. The diagnose Mode is only a temporarily mode (the set will go back to the previous mode), and can not be switched on permanently.

Note: The diagnose mode can not be entered if the SAM is activated.

Compair

Compair (Computer Aided Repair) is a service tool for Philips Consumer Electronics products. Compair is a further development on the DST service remote control allowing faster and more accurate diagnostics. Compair has three big advantages:

Compair helps you to quickly get an understanding how to repair the MG2.1E in short time by guiding you step by step through the repair procedures

Compair allows very detailed diagnostics (on I²C level) and is therefore capable of accurately indicating problem areas. You do not have to know anything about I²C commands yourself; Compair takes care of this. Compair speeds up the repair time since it can automatically communicate with the MG2.1E (when the micro processor is working) and all repair information is directly available. When Compair is installed together with the SearchMan MG2.1E electronic manual, schematics and PCBs are only a mouse-click away

Compair consists of a Windows based fault finding program and an interface box between PC and the (defective) product. The Compair interface box is connected to the PC via a serial or RS232 cable. In case of the MG2.1E chassis, the Compair interface box and the television communicate with each other via bi-directional infrared signal.

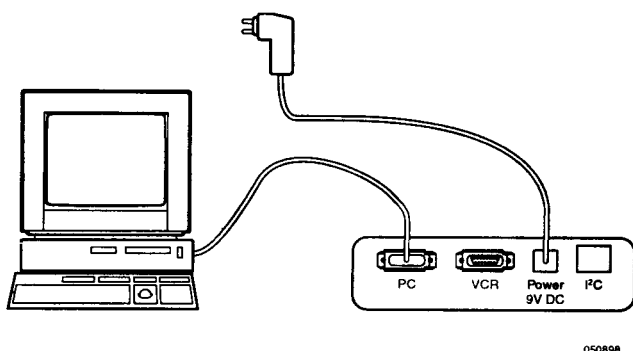


Figure 5-3

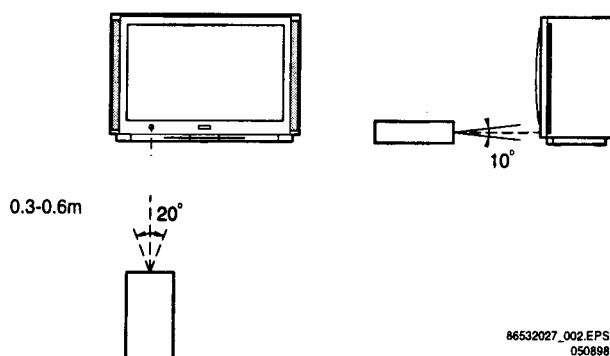


Figure 5-4

The Compair fault finding program is able to determine the problem of the defective television. Compair can gather diagnostic information in 2 ways:

1. communication to the television (automatic)
2. asking questions to you (manually)

Compair combines this information with the repair information in its database to find out how to repair the MG2.1E.

Automatic information gathering

Step-by-step start up Under normal circumstances, a fault in the power supply or an error during start-up will switch the television to protection-mode. Compair can take over the initialisation of the television. In this way it is possible to distinguish which part of the start-up routine (hence which circuitry) is causing the problem.

Reading out the error buffer Compair can automatically read out the contents of the entire error buffer.

Diagnosis on I²C level. Compair can access the I²C bus of the television without a physical connection. Compair can send and receive infrared commands to the micro controller of the television. These commands are translated by the controller to I²C commands and vice versa. In this way it is possible for Compair to communicate (read and write) to devices on the I²C busses of the MG2.1E.

Manual information gathering

Automatic diagnosis is only possible if the micro controller of the television is working correctly and only to a certain extend. When this is not the case, Compair will guide you through the fault finding tree by asking you questions and showing you examples. You can answer by clicking on a link (e.g. text or an oscillogram) that will bring you to the next step in the fault findig process.

A question could be: Do you see snow? (Click on the correct answer)

YES / NO

An example can be: Measure testpoint I7 and click on the correct oscillogram you see on the oscilloscope

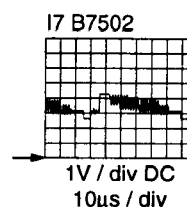


Figure 5-5

By a combination of automatic diagnostics and an interactive question/answer procedure, Compair will enable you to find most problems in a fast and effective way.

Additional features

Beside fault finding, Compair provides some additional features like:

- Uploading / downloading of presets
- Managing of preset lists
- Emulation of the Dealer Service Tool

SearchMan (electronic service manual)

When Compair is installed in combination with SearchMan, all schematics and PCBs will be directly available while you repair a television if you click on a PCB or schematic link:

Example: Measure the DC voltage on C2568 (PCB / schematic) on the small signal level..

Clicking on PCB will automatically pop-up a picture of the PCB with the location of C2568 marked. Clicking on schematic will automatically pop-up the schematic with the location of C2568 marked.

5.3 Error codes

5.3.1 Reading error codes from the error buffer

The error buffer can be read in 2 ways:

1. On the screen via the Service Alignment Mode (SAM) In case picture is OK, the error buffer can be read the easiest via the SAM. In the main menu of the SAM the last 10 different error codes occurred are displayed. The most recent detected error code is displayed on the left side, so e.g.: 0 0 0 0 means no error codes present in the buffer 3 0 0 0 means one error code present in the buffer; error code 3 2 3 0 0 means two error codes present in the buffer; error code 2 is the most recent, error code 3 is detected before 2
2. On the display of the DST If an error has been detected by the MG2.1E chassis, the set might go into protection. Without the presence of a picture the errors can be read by the DST, as long as the main-processor is still active (green LED continuous and red LED blinking fast (5Hz); in case of red LED is blinking slow (1,25Hz) there is a main-processor problem). To transmit the errors from the TV to the DST:
 1. Press the "DIAGNOSE" key (in all modes except the SAM)
 2. Press "1" to view the last error detected.

3. Hold the DST 5 to 10 cm from in front of the stand-by LED of the set (the IR-sending LED of MG2.1E is located near the stand-by LED).
4. Press the "OK" key.

The error is represented by a 2 digit number. The 2 digits on the DST are displayed sequentially, with a pause before it is repeated. The digit after the pause is the 1st digit. If the display reads 4 - 7, the error code is 47. To read other error codes, press "DIAGNOSE" and one of the other digit keys. Note:

- If the DST cannot communicate to the MG2.1E in a proper way, ERROR 2 is shown in the display of the DST. Trying again by changing the DST position a little bit might often help.
- If the error buffer of MG2.1E is empty, no errors are displayed by the DST; the display remains blank.

5.3.2 Clearing the error buffer

The error buffer can be cleared in 2 ways:

1. In the SAM by selecting the item RESET ERROR BUFFER in the main menu.
2. By the "DIAGNOSE 99" command of the DST (in all modes except the SAM). Press the DIAGNOSE key on the DST, followed by 9 and 9 and then >.

5.3.3 Error code table

Table 5-1 Error messages

Error	Device	Description	item	Diagram	Defective module indication
1	ST24E16	Non volatile memory	IC7008	K7	Control
2	ST24E32 or M24C32	Non volatile memory	IC7008	K7	
3	SAA5800	OTC2.5 microprocessor/TXT	IC7003	K7	
5	UV1316	Tuner	U1102	K1	Tuner
15	TDA9320H	HIP I/O-video processing	IC7501	K1	Chroma IF IO
20	TDA9330H	HOP video control/deflection processor	IC7300	K6	Video Controller
25	MSP3410D	ITT sound processor	IC7751	K3	Audio module
26	SAA7712H	SEDSP dolby processor	IC7770	K4	
50	SAA4978H	Picnic	IC7609	K5	Feature Box
51	SAA4990H	Prozonic	IC7608	K5	
65	Slow I ² C		fig 5.7		Slow I ² C
66	Fast I ² C		fig 5.7		Fast I ² C
67	Supply 5V	5V2	fig 5.6		+5 V Supply
68	Supply 8V	8V6	fig 5.8		+8V Supply
20	V fail protection	VFB	fig 5.9	A3/A2/K6	Vertical Flyback
71	H fail protection	HFB	fig 5.9	A2/K6	Horizontal Flyback
73	Line Deflection protection	LDP	IC7484	A2/K6	Line Deflection
74	Beam Current Protection	BC-PROT	TS7351	K6/K7	Beam Current
76	DC Sound protection	DC-PROT	TS7762	A4/A1	Sound Output
77	Feature box protection	FBX-PROT	fig 5.5	K4	+3V3 (FBX) Supply

Remark: If on the DST the text "ERROR 2" is displayed, this means that the communication from the TV to the DST has failed

5.4 Protections

5.4.1 General

The MG2.1E "Protection Diagram" shows the structure of the protection system. See protection diagram (fig 5.6)

One micro-processor.

The MG2.1E has only one micro-processor (OTC) and it remains active during Standby. This because power of the uP and the attached memory chip set is coming from the 3V3 supply, which is derived from the 5V Standby-circuitry. So in both power-on as in Standby-mode the uP is connected to this power supply. The micro processor controls the Standby-line for switching on and off the main supply. In the standby-mode or in the protection-mode the Standby-line will open the contacts of relay 1002 via T7000 and T7001, this results in switching off the mains input to the main supply (FFS). In the mean time via T7550 the intensity of LED of the opto-coupler will increase, which results in a quick slow-down of the FFS supply.

Two service-modes

To get a quick diagnoses the MG2.1E has two service-modes implemented:

The service default mode. Start-up of the set in a predefined way.

The service alignment mode. In this mode items of the set can be adjusted via a menu and with the help of test patterns.

Both modes can be entered via the service connector on the SSP (connector 0356) or via the DST (dealer service tool) or via Compar. The service alignment mode can not be entered in Standby, the set has to be in normal operation.

Protection levels

If a fault situation is detected an error code will be generated and if necessary the set will be put in the protection-mode. The protection-mode is indicated by blinking of the red LED. In some error cases the micro processor does not put the set in the protection-mode. The error codes of the error buffer can be read via the service-menu (SAM) or via the service send-LED and the DST/ Compar. The DST diagnose functionality will force the set in to the Service-standby, which is alike the usual Standby, however the micro-processor has to remain in normal operation completely.

The protections of the MG2.1E can be divided in 4 groups

- Protection from I²C-busses (Fast and Slow) or I²C-IC errors (device errors)
- Protection from the inputs on the OTC
- Protections from the status register of the HOP (communicated via I²C-bus)
- DC-protection (sound amplifiers) monitored on OTC

5.4.2 Protection from the I²C bus (fig. 5.7)

In normal operation some registers of the I²C controlled ICs will be refreshed every 200 msec. During this sequence three I²C-busses and the I²C -ICs as well will be checked. The I²C protection will take place if the SDA and SCL are whether short

circuited to ground or to each other. An I²C error can also occur, if the power supply of the IC is missing.

Protection from the inputs on the OTC (fig.5.8)

If a protection is detected at an input of the OTC, all protection inputs of the OTC will be scanned every 200 msec. for 5 times. If the protection on one of the inputs is still activated after 1 sec., then the set will be put in the protection-mode. Before the scanning is started a so called ESD-refresh will be carried out first, because the interrupt on one of the inputs may be caused either by a FLASH or by ESD. As a FLASH or ESD can harm the settings of some ICs, the HOP-HIP-ITT-EDRIC (Dolby-IC)-TEA6417-TEA6422-LTP-PICNIC and Tuner are initialised again to ensure the normal picture and sound conditions of the set.

- 8V6 and 5V2 protection. (See detailed figure 5.8)
- The presence of the 8V6 and 5V2 is sensed by the OTC. If the 8V6 and 5V2 is not present, then an error code is stored in the error buffer and the set is put in the protection-mode.
- BC protection (Beam Current). (See detailed figure 5.8)
- The beam current is measured by a circuit on the SSP. If the beam current exceeds a certain reference level, then via D6350 and T7351 the BC-input of the OTC is set to high. The error code is stored in the error buffer and the set is put in the protection-mode.
- LDP-protection (Line Deflection Protection) (See detailed figure 5.8)
- Two protection circuits are connected to the LDP-input of the HOP :
 1. Flash detection. From the EHT-info, via D6341 and T7341 a flash will stop the H-drive and line output stage immediately. The FLS-bit in the status register of the HOP is set to 'high'. As the duration of a flash is very short the FLS-bit will be reset to 'low' again after the flash refresh, so via a slow start the set will be started again.
 2. LDP detection. The EW-protection, coming from the line-output is also connected to the same input as above. The current through the EW-stage is measured by R3483 and R3484 on the LSP. The voltage across these precision resistors will increase in case of a failure at the line output stage. If the voltage becomes higher than 1 V, then the output of IC7484 will become 'high' and remains 'high' via D6485 and R3490. Via D6344 the H-drive will be stopped. The FLS-bit will be set to 'high' and remains 'high' by means of the software filtering even after a flash refresh. The OTC will put the set Standby-mode. The error code is stored in the error buffer and the set gets into the protection mode.

5.4.4 Protections from the status register of the HOP (fig. 5.9)

Every 200 msec. the status register of the HOP is read by the OTC via I²C. If a protection signal is detected on one of the inputs of the HOP, then the relevant error bit in the HOP register is set to 'high'. If the error bit is still 'high' after 1 sec., the OTC will store the error code in the error buffer and depending on the relevancy of the error bit the set will either go into the protection-mode or not.

HFB : Horizontal Flyback (See detailed figure 5.9) Missing the horizontal fly back pulse is detected via an input of the HOP. One status bit is set to 'high'. The error code is stored in the error buffer and the set will go into the protection mode

VFB : Vertical Flyback (See detailed figure 5.9) The HOP will blank the screen, if the vertical flyback signals are not present at the VFB-guard input. The relevant status bit will

be set in the register of the HOP. The error code is stored in the error buffer, in this case protection is not necessary.

5.4.5 DC-protection, sound amplifiers (Fig. 5.10)

This is an urgent protection, the circuitry is located at the LSP. The output of the protection circuit will slow-down the FFS power supply immediately via the opto-coupler and via the Standby-relay the supply will be switched into Standby-mode at once. To be able to store the error code in the error buffer the protection signals are also wired to the OTC.

The protection is activated in case of

- unbalance of +Vs and -Vs

- unbalance of +7V7 and -7V7

- DC output present on one of the audio amplifiers

5.5 Fault find trees

See fault find trees at the end of this chapter. (figures 5.11-5.17)

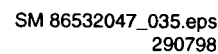


Figure 5-6

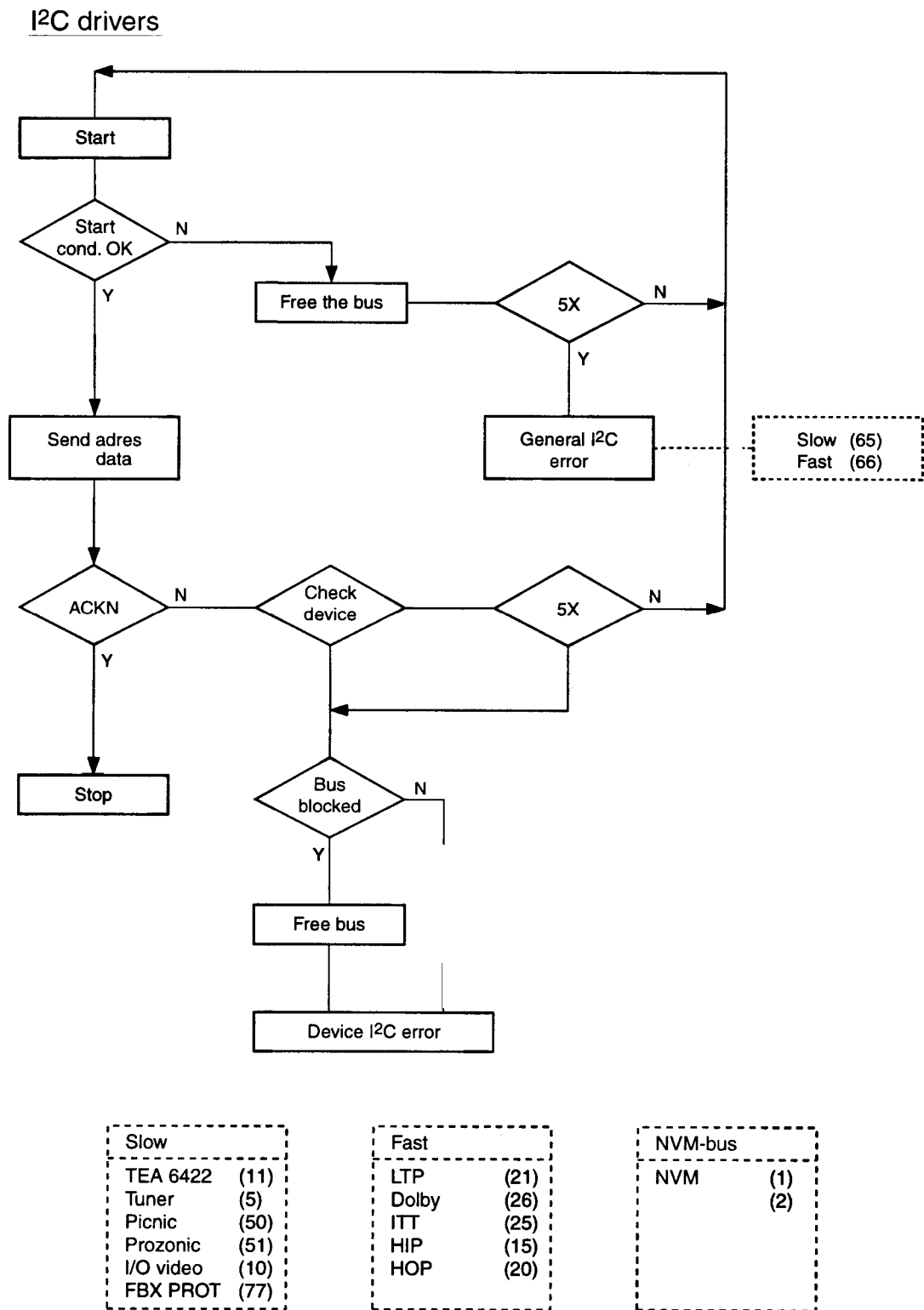


Figure 5-7

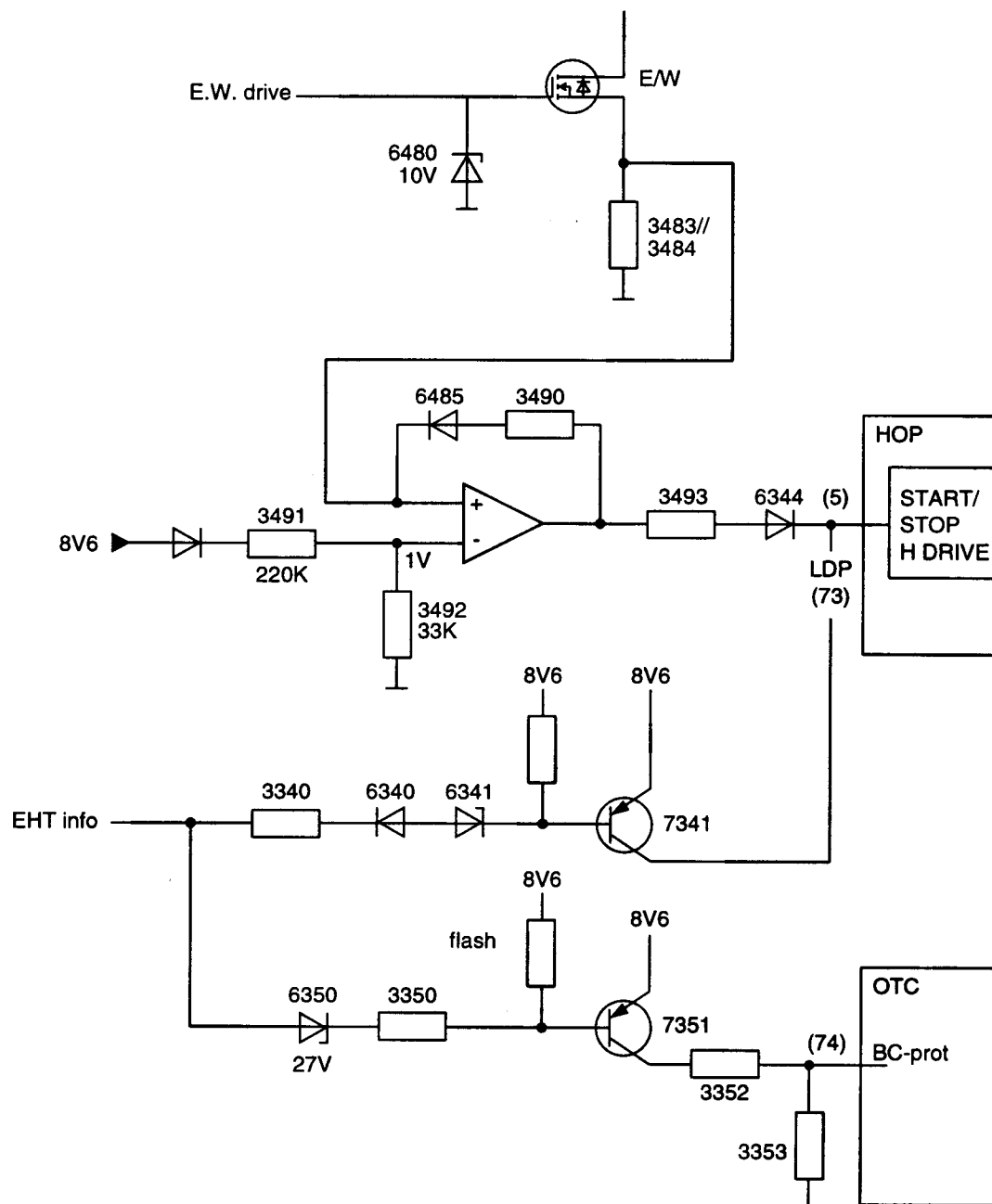
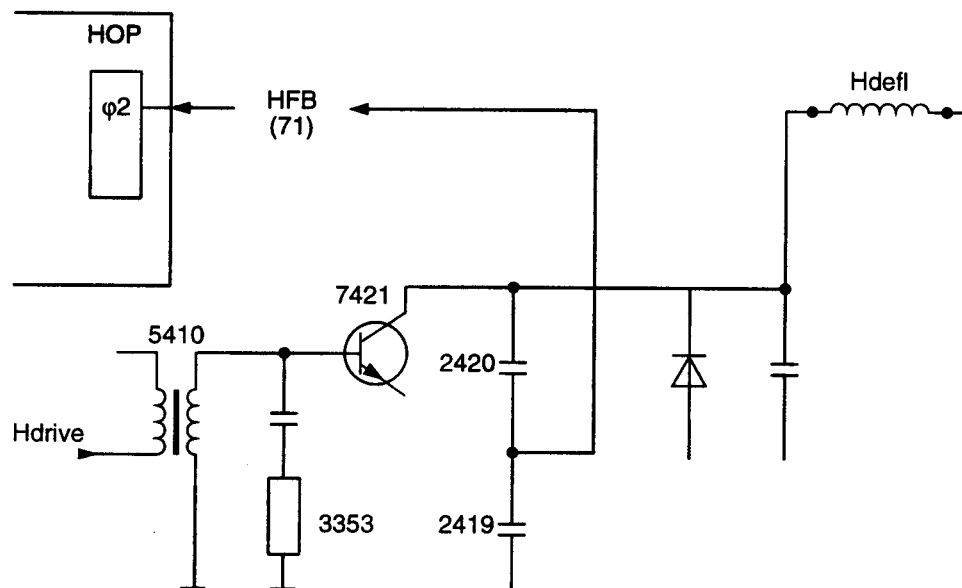


Figure 5-8

HFB horizontal fly-back



VFB vertical fly-back

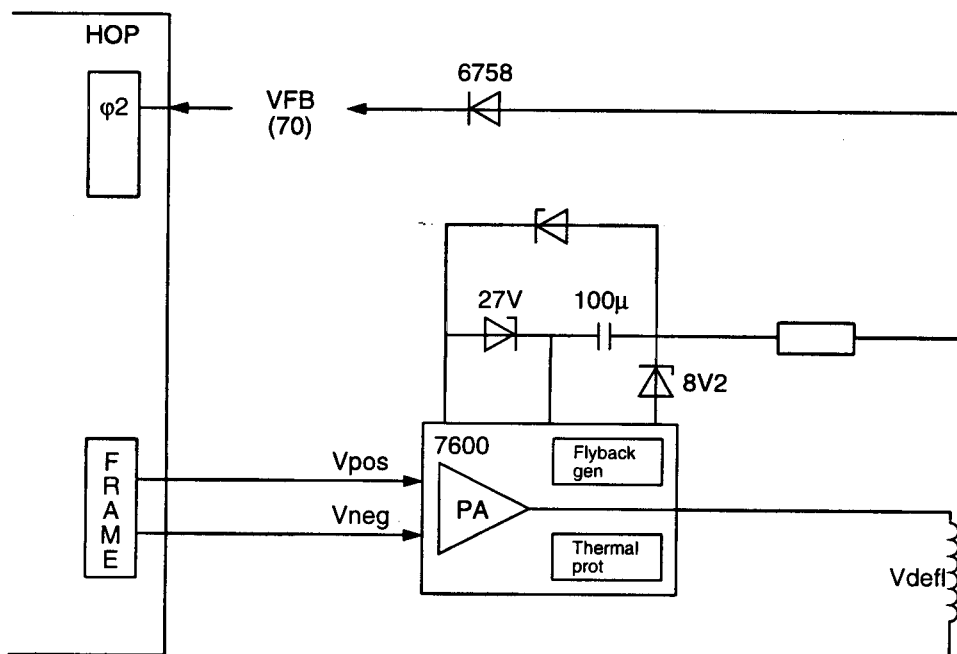


Figure 5-9

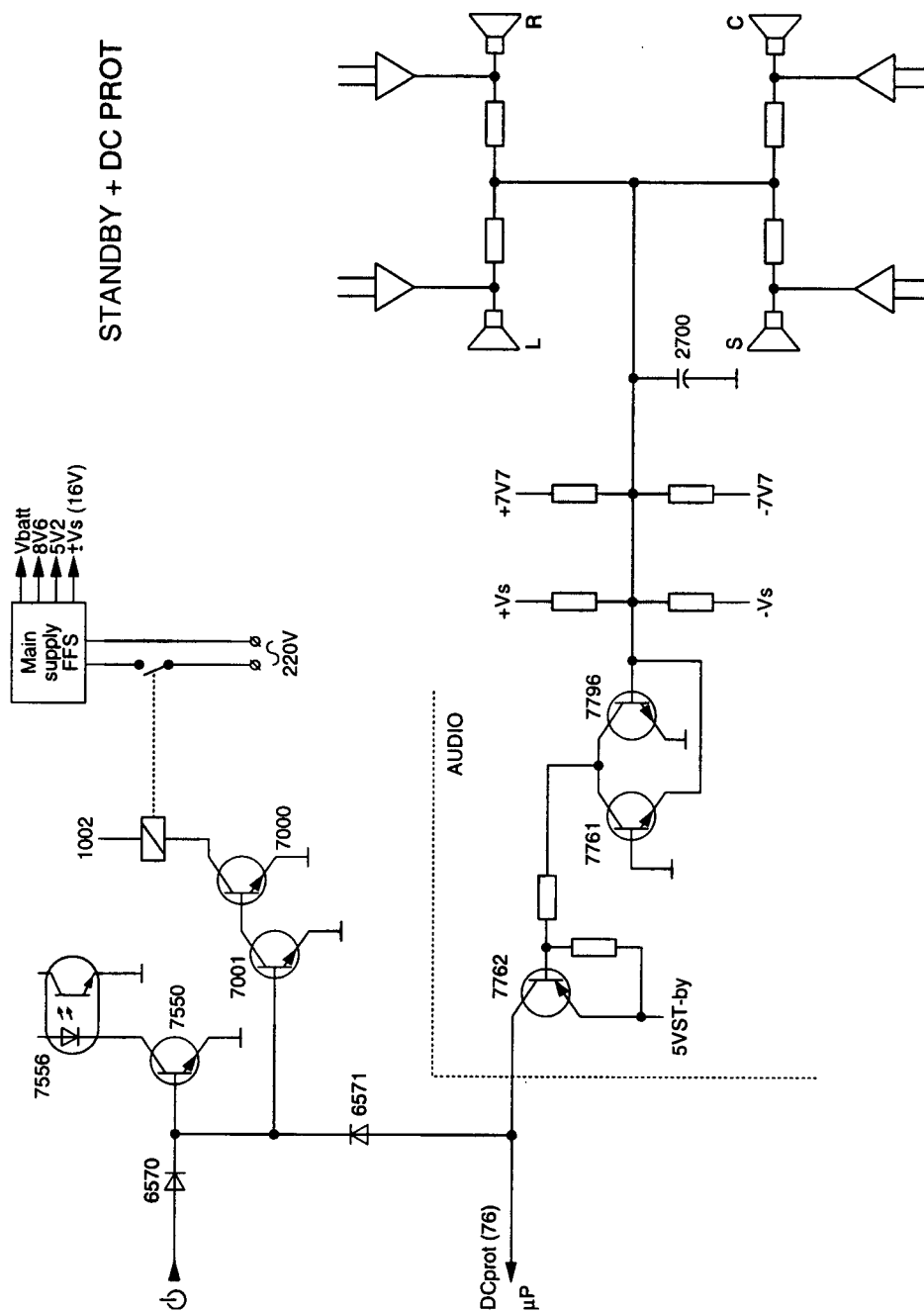
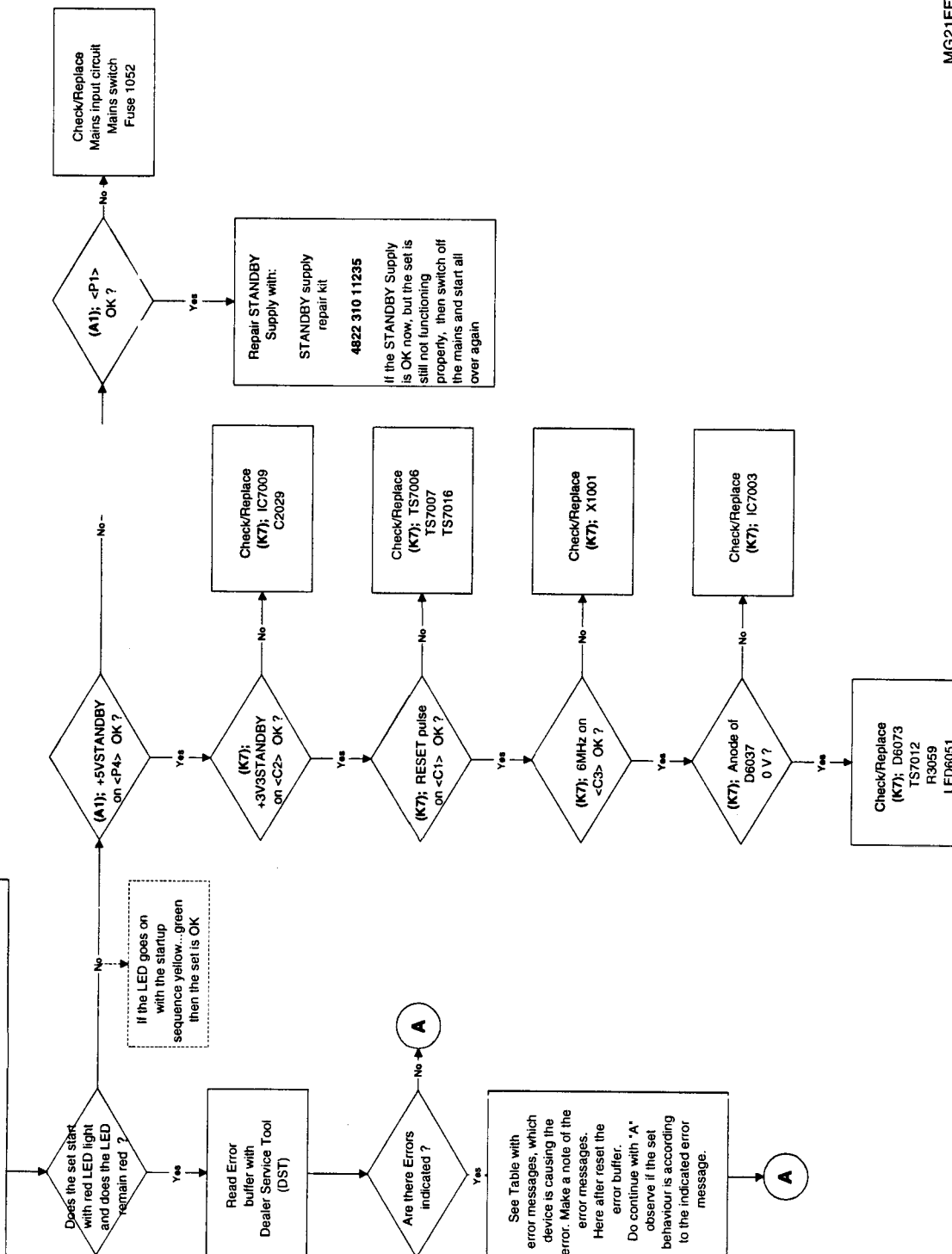


Figure 5-10

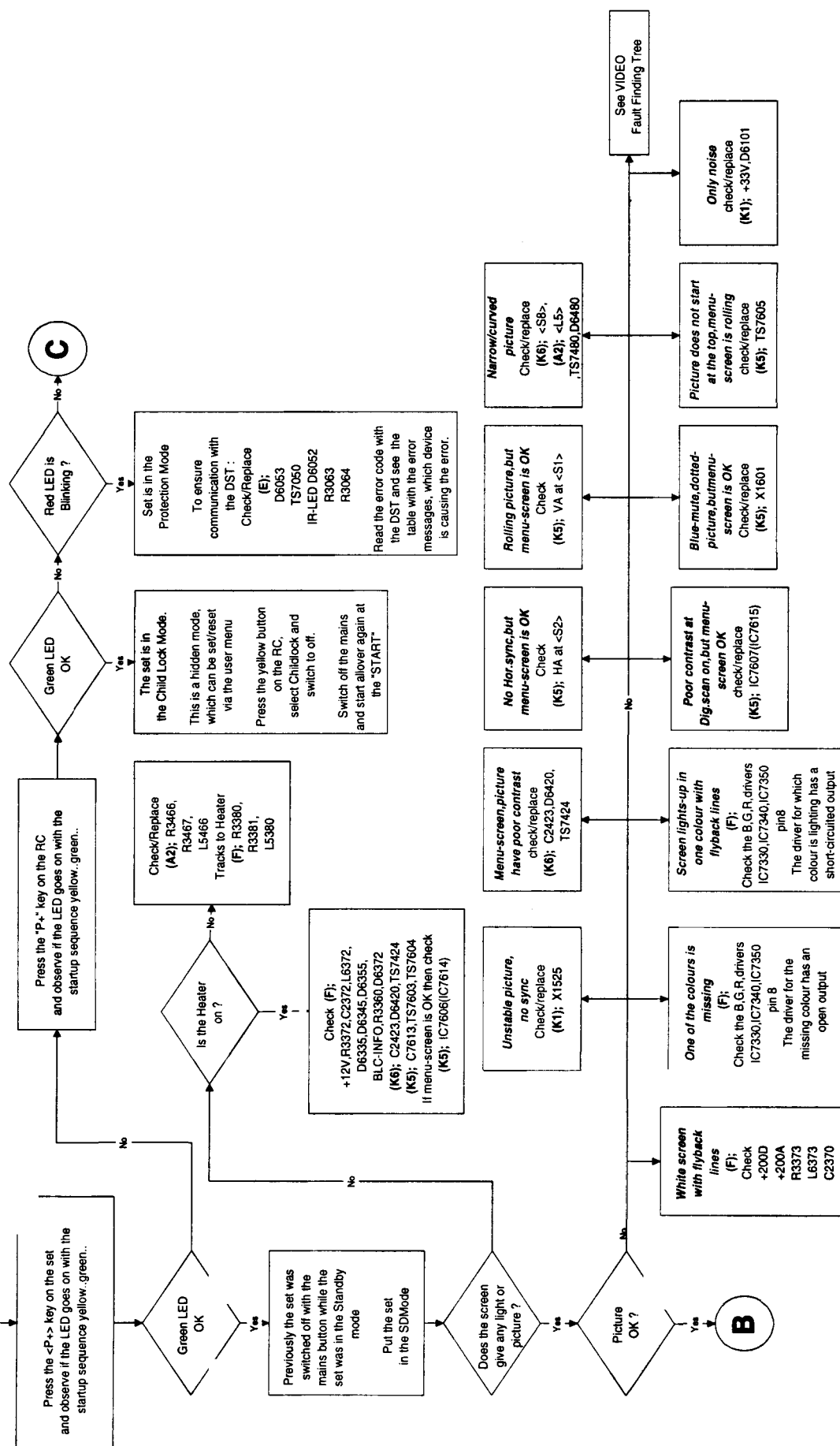
START

Connect a pattern generator to the aerial input.
Set Patt.gen. to 475,25 MHz, colourbar, stereosound, PAL B/G (for France SECAM L).
Put Mainswitch : on
In normal conditions the set will start with the sequence :
red LED...yellow LED...green LED.
Then after few seconds sound and picture will appear



Note:
(K1) means Drawing K1
<F1> means Test point F11

Figure 5-11



MG21FFT2.VSD

Figure 5-12

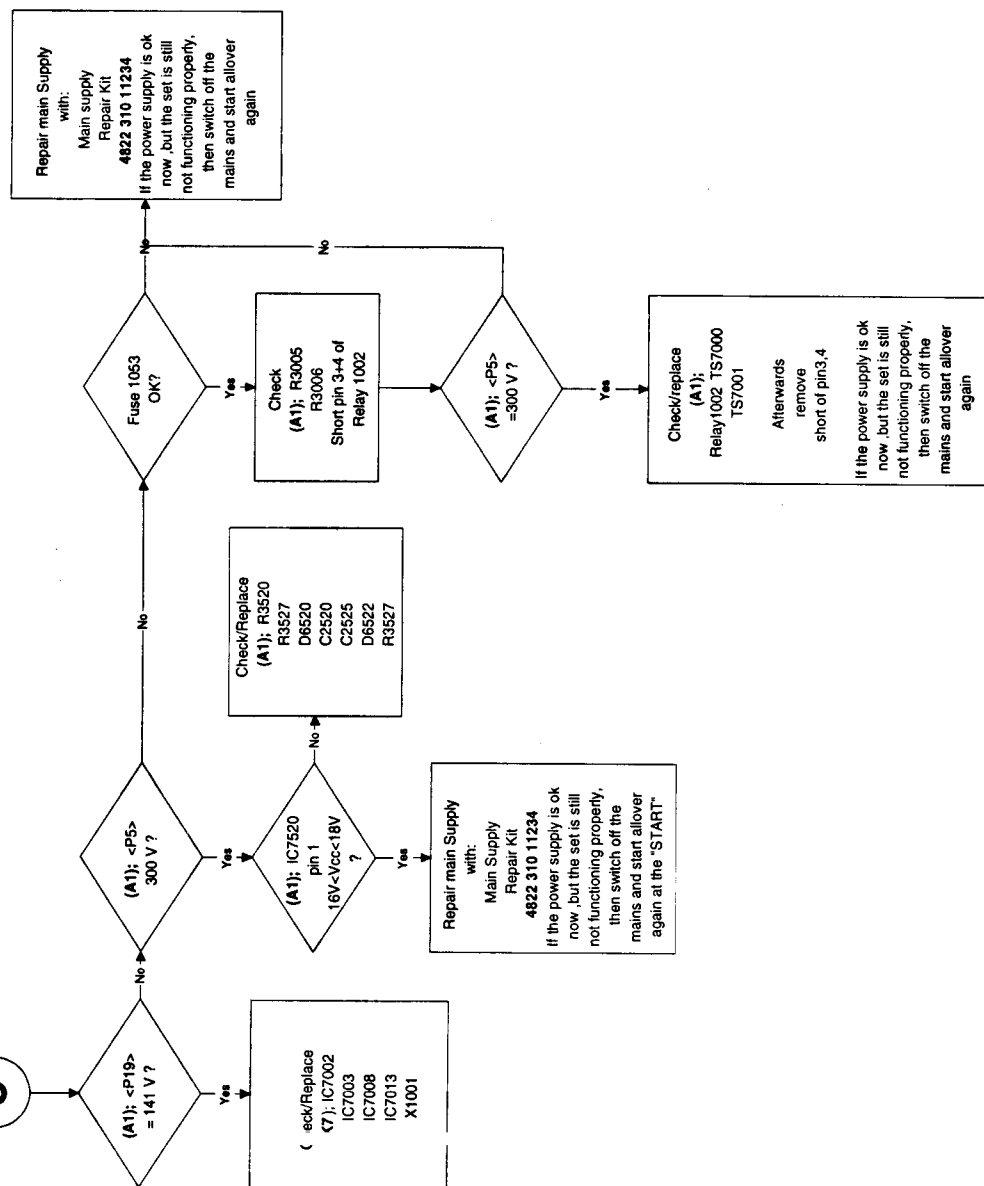


Figure 5-13

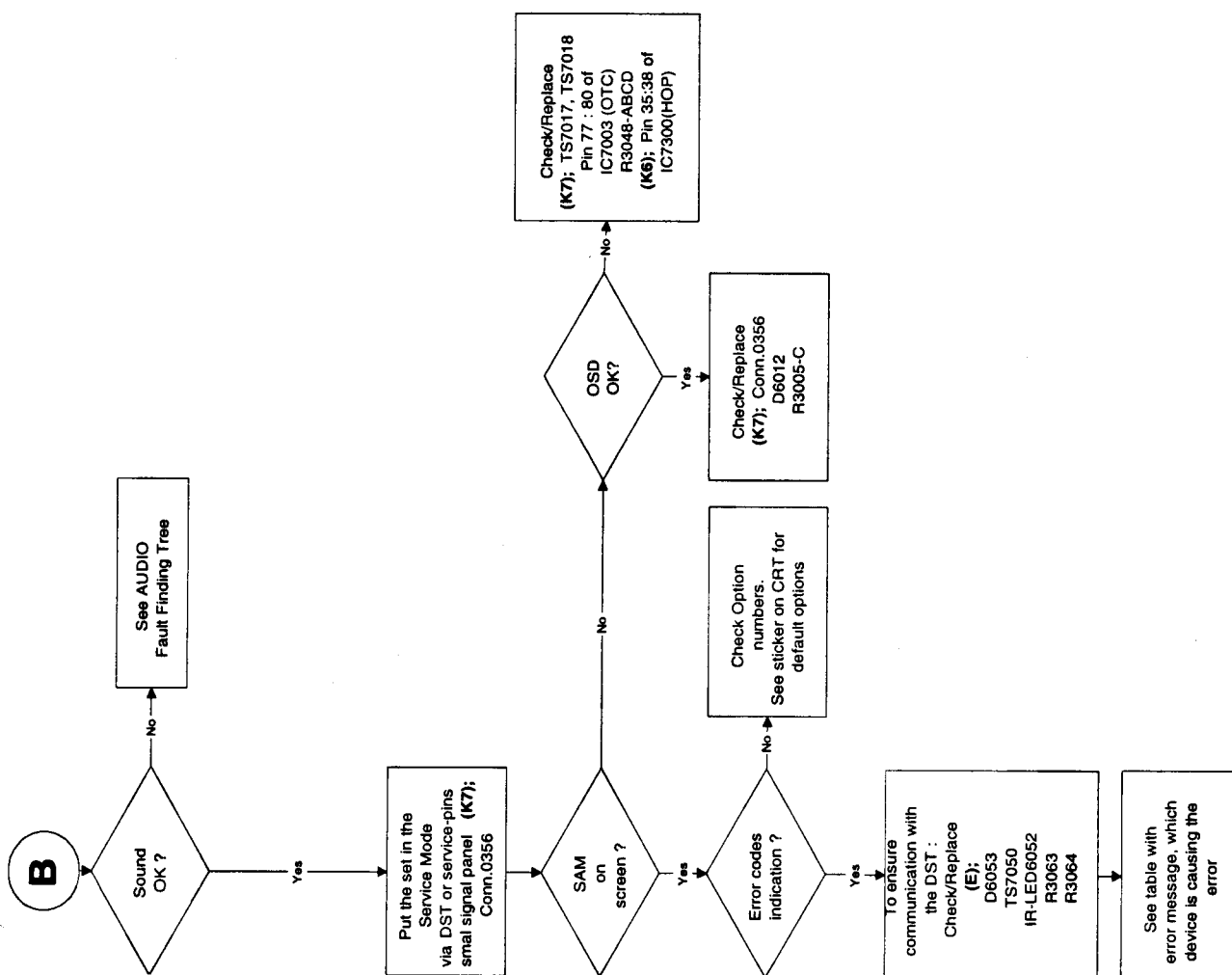
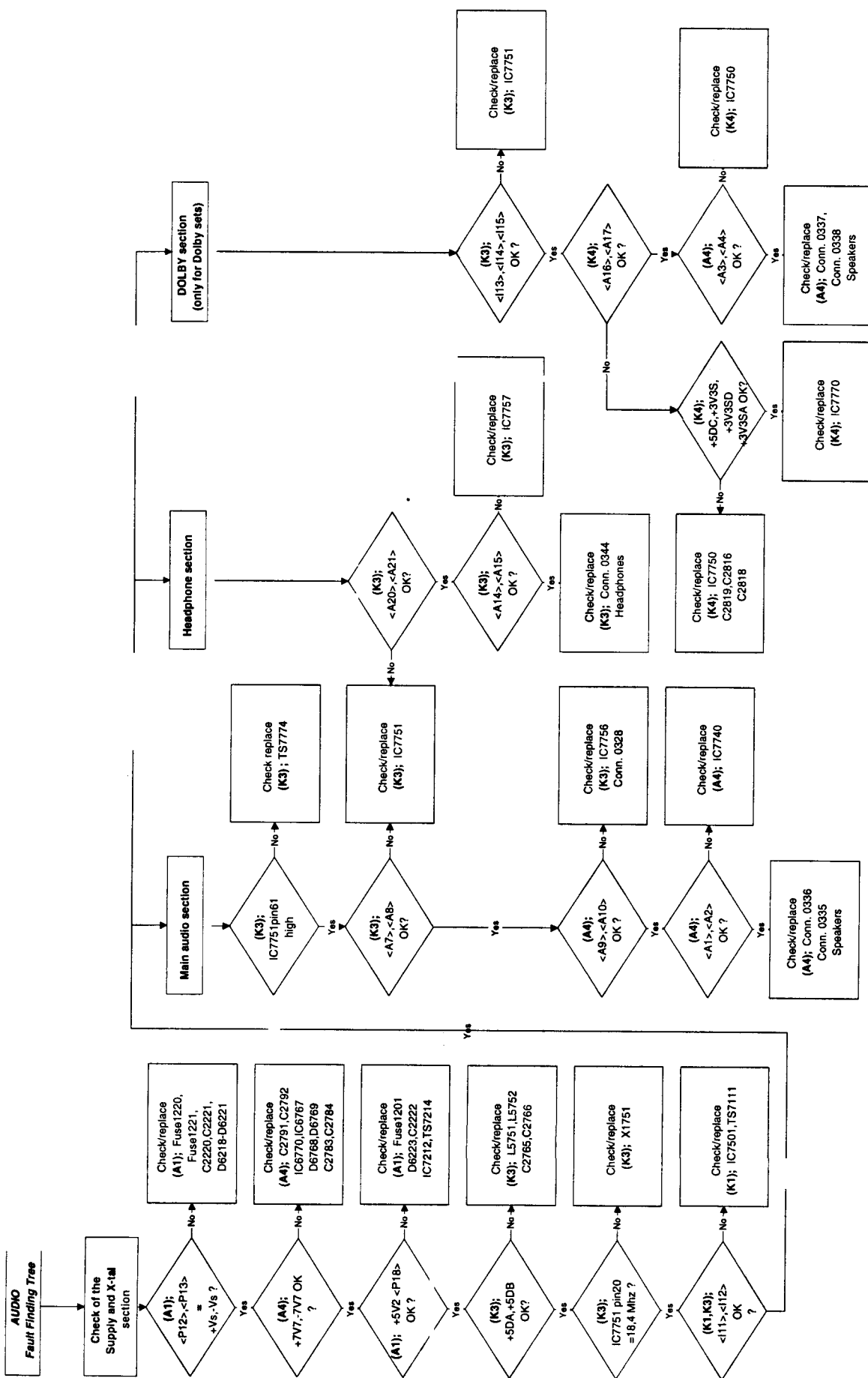


Figure 5-14



MG21FFT5.VSD

Figure 5-15

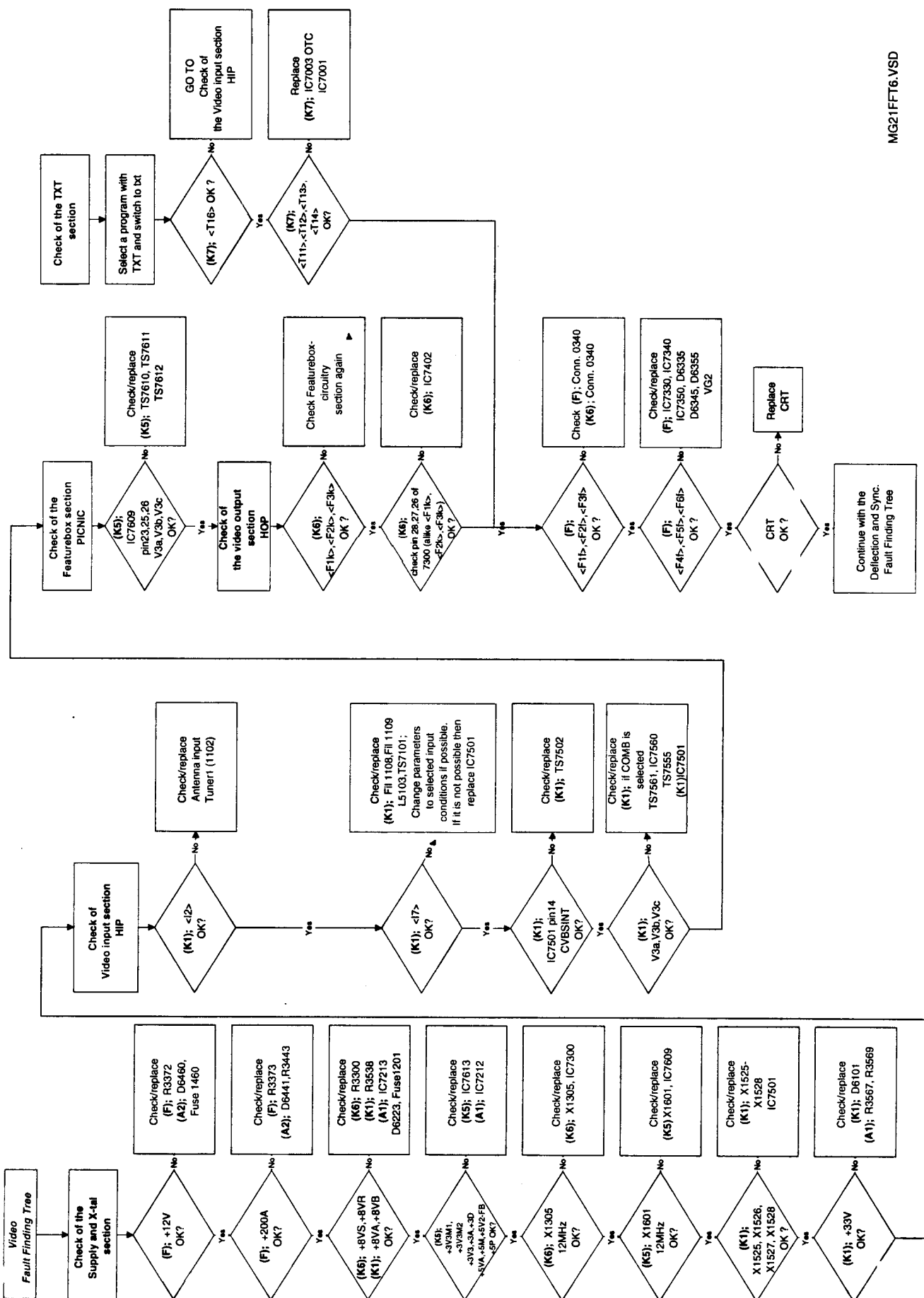
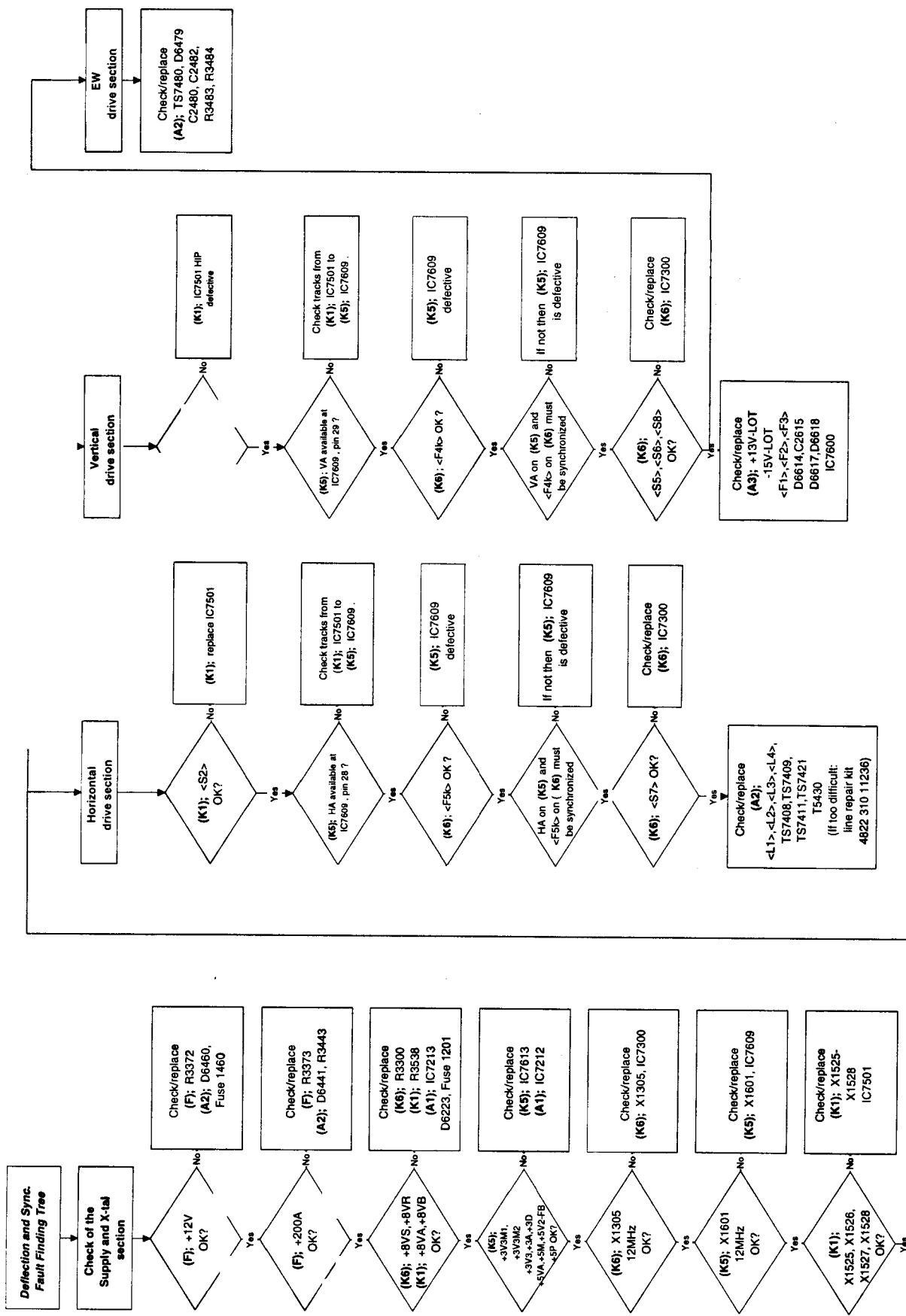


Figure 5-16



8.1 General alignment conditions

All electrical alignments should be made under the following conditions:

- Power supply voltage: $220\text{-}240\text{V} \pm 10\%$; $50\text{-}60\text{ Hz} \pm 5\%$
- Warm-up time >10 minutes
- Voltages and oscillograms are measured in relation to tuner earth (with exception to the voltages on the primary side - of the power supply). Never use the cooling fins/ plates as ground.
- Test probe: $R_i > 10\text{ MOHM}$, $C_i < 20\text{ pF}$.

8.2 Alignments on the large signal panel (LSP)

+141V (VBAT) supply voltage

Connect a voltmeter across C2569 (diagram A1, +VBAT). Switch on the set. Using potentiometer R3559 (diagram A1) adjust the VBAT supply voltage to $+141\text{V} \pm 0\text{V5}$. (see fig. 8.1)

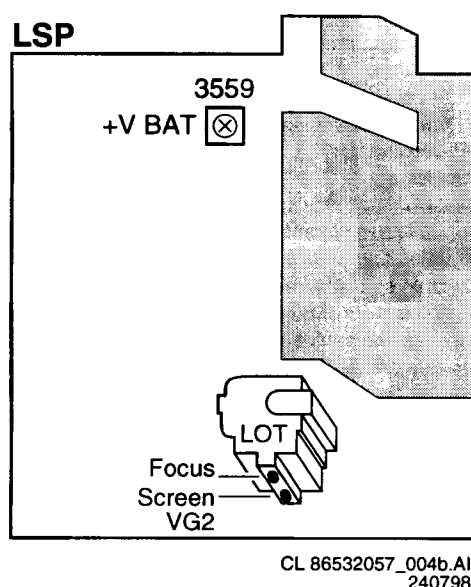


Figure 8-1

Focusing

Tune the set to a cross hatch test-pattern. Adjust the focus potentiometer (diagram A1, upper knob on the LOT) for an overall optimum focusing of the picture.

Vg2 adjustment

Elucidation: In the frame blanking period of the R,G and B signals applied to the CRT, alternately per frame two measuring pulses with different DC levels are inserted by the "HOP" video processor IC7300. In one frame blanking a pulse is inserted used as reference for the Vg2 adjustment and in the next frame blanking a pulse is inserted used as reference for the internal white "D" adjustment. For the Vg2 adjustment the pulse with the highest DC-level is used.

Put the set in the SDM mode (via the <default> button on the DST, or via short circuiting the SDM pins 2 and 3 of connector 0356 on the SSP (diagram K7). Insert a black test-pattern signal (carrier 475.25 MHz) to the tuner input. Connect an oscilloscope (position 50V/Div DC and 2ms/Div) alternately to the CRT cathodes (red pin 8, green pin

6, blue pin 11) and measure for each cathode the DC level of the measuring pulse (see elucidation above and fig. 8.2) and write down each value. Remark: Trigger the scope extern via a CVBS signal (for instance via pin 19 of the scart1 connection).

- Adjust the VG2 potentiometer (fig. 8.1, lower knob on the LOT) so that the measuring pulse with the highest noted level is on 160V level.

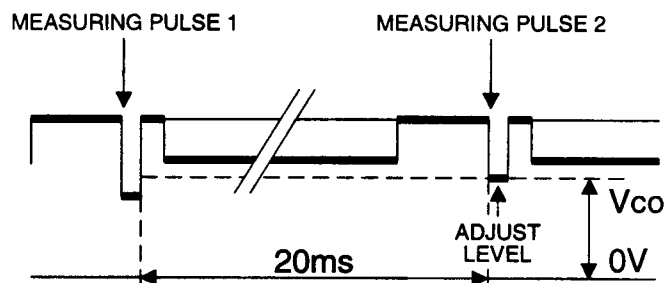


Figure 8-2

8.3 Alignments on the small signal panel (SSP)

8.3.1 40.4 MHz neighbour-channel sound trap

- Tune to a checker board test-pattern (system BG or relevant system - and carrier frequency of 475.25 MHz).
- Connect an oscilloscope (trigger line frequent) to pin 19 (CVBS out) of the scart1 connection.
- Turn the core of L5103 (diagram K1) completely downwards. (see fig. 8.3)
- Turn the core upwards till under and overshoot arise at the black/white and white/black transitions in the video signal. (see fig. 8.4)
- Turn the core downwards again till above mentioned under and overshoot is just disappeared.

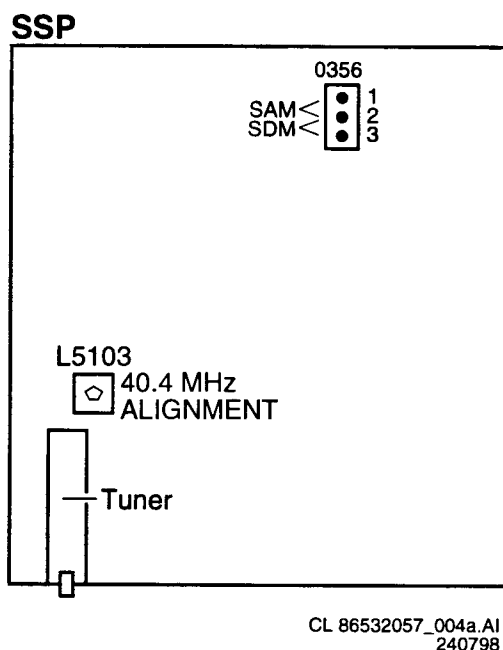
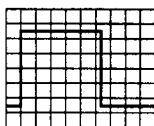
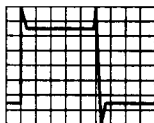


Figure 8-3



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Figure 8-4

8.4 Alignments needing SAM-mode + measuring equipment

(these alignments could be of interest when ICs (7501, TDA9320H), or the EARAM (7008, ST24E16) are exchanged on the SSP)

8.4.1 'IF AFC' (navigation to this menu item via Alignment --> General--> IF AFC)

Supply via a Service generator (e.g. PM5518) a TV-signal, with a signal-strength of about 1 mV. Preferable this signal is a multiburst signal. Frequency 475.25 Mhz. Use BG if possible, otherwise match the system of your generator with the received signal in the set. In this procedure Servicer will be asked to swap sometimes from Install-menu to Service Alignment Menu. Procedure how to check correct alignment:

- First set frequency TV-set to 475 Mhz in 'search-line' of Manual Installation Menu
- IF frequency-value in 'Fine Tune'-line between 475.18 and 475.31, you do not need to re-align AFC-value as mentioned above (SAM-menu)
- IF this is NOT the case, decrease 'IF AFC'-value (in SAM-menu) if frequency on 'Fine-tune'-line was lower than 475.18, or increase 'IF AFC'-value if frequency on 'Fine-tune'-line was higher than 475.31. (initially first a 'IF AFC'-alignment can be done, making the multiburst signal flat. This signal can be measured at pin 19 of scart 1. This is however not accurate enough to optimise the 'IF AFC'.

Alignment procedure:

- set 'IF AFC'-value in SAM
- store in SAM this setting
- go to manual install menu
- set frequency to 475
- read in 'Fine tune'-line how set responds
- if this value is between 475.18 and 475.31 then OK, otherwise proceed alignment by setting other 'IF AFC'-setting

Service-tip:

If you do not trust the accuracy of the frequency of your Service-generator first 'measure' with 'Fine tune'-line (manual install-menu) of a good set your Service generator.

8.4.2 'Tuner AGC'

Supply a TV-signal, with a frequency of 475.25 Mhz and a signal-strength of about 2 mV.

Measure the DC-voltage on pin 1 of the Tuner. (item 1102)
With the 'Tuner AGC'-alignment in the SAM-menu, this voltage

can be aligned. Alignment is correct when DC-voltage is just below 3.8 V

8.5 Alignments and settings in the Service Alignment Menu

8.5.1 General

To switch to SAM-mode you have to do the following:

briefly shorting the service pins 'SERVICE ALIGNMENT MODE' on the frontside of the SSP (pins 1 and 2 of connector 0356) or:
pressing the <align>- key on the Dealer Service Tool (DST) (RC7150), followed by keying in the password "3140" and then pressing the <OK> key.

The Service Alignment Mode menu will now appear on the screen. The following information is now displayed:

1. The software date ('Date') and version ('ID.') of the ROM. (Example: MG21E11.0_01381) (this software-code stands for MG21 (chassis), E for Europe, 1-language, 1.0 software version, xxxxx latest 5 digits of 12nc code software)
2. The accumulated total of operation hours ('Operation Hours').
3. ('Errors') followed by maximal 10 errors. The most recent error is displayed at the upper left. For explanation errors see chapter 5
4. ('Defect. Module'). Here the module that generates the error is displayed. (if there are multiple errors in the buffer that have not all been generated by a single module, there is probably another defect. The message 'Unknown' will then be displayed here).
5. ('Reset Error Buffer'). The error buffer can be resetted by pressing the 'cursor right' key.
6. ('Functional Test'). All devices are tested via the > key. Eventual errors are displayed in the error buffer. The error buffer is not erased, the contents return when the Functional Test is terminated.
7. ('Alignments'). This enables the Alignments sub-menu to be called up.

The following alignments can be selected:

'General':

- Alignment of 'Drive'
- 'Peak White Limiter'
- 'Luminance Delays'
- 'EHT Compensation'
- 'Soft Clipper'
- 'Luma Gain'
- 'IF AFC'
- 'Tuner AGC'

'Normal Geometry':

- General geometry alignments.

'Super wide geometry': (only valid for widescreen sets)

- Geometry alignments for the 'Panorama' position in 16:9 sets. (only valid for wide screen sets; alignments can be performed, however it is better to set values as mentioned below)

'Options':

- Setting the initialisation codes in the set via text.

'Option number':

All options together, expressed in two long numbers. The original factory setting for these numbers can be found on the picture tube sticker on the inside of the set.

'Store':

- Store all alignments.

'Store default settings':

Reset all values in the EAROM to pre-programmed values, related to picture and sound settings (has the same effect as replacing the EAROM with a new one, only here also the programs are gone).

The alignments are explained now in the sequence of the sub-menu:

8.5.2 General alignments in Service Alignment Menu:

Once all alignments/settings have been completed the item 'Store' must be selected to record all the values in the permanent memory of the set.

If the option codes have been changed and stored, the set has to be switched on and off using the mains switch to activate the new settings (when switching on and off via Standby, the option code settings are NOT read by the microprocessor).

If an empty EAROM (permanent memory) is detected, all settings are set to pre-programmed default (standard) values.

A built-in test pattern can be called up in various sub-menus. The test pattern generator can be switched on using the item 'Test pattern on/off'. The test pattern only appears AFTER the specific alignment has been selected. The test patterns are generated by the teletext-IC.

'Drive'

Tint-settings:

Set the white levels for the three tint-settings 'Normal' . 'Warm' and 'Cool' is calculated by the processor then ('Warm': R+4, B-7 and 'Cool': R-3, B+3) For 4:3 picture tubes (25" and 29") the next values must be entered:

	Cool	Normal	Warm
R	22	25	29
G	20	20	20
B	17	14	7

For wide screen picture tubes (24", 28" and 32") the next values must be entered:

	Cool	Normal	Warm
R	22	25	29
G	20	20	20
B	17	14	7

'Cathode':

This alignment, must also be covered by a table with values for all picture-tube sizes. For 4:3 picture tubes (25" and 29") the next value must be entered: 5 For wide screen picture tubes (24", 28" and 32") the next values must be entered:

'Peak White Limiter'

Dependent of the picture-tube size (25", 29", and 24"/28"/32" widescreen tubes) the next value of the table must be

entered:

24"	10
25"	10
28"	10
29"	10
32"	10

'Luminance delays'

With the 'Luminance delays' alignment the luminance information is placed on the chrominance information (brightness is pushed onto the colour). Use a colour bar/ grey scale pattern as test signal.

Lum. Delay Pal: Apply a PAL colour bar/greyscale pattern as a test signal. Adjust 'Lum. Delay Pal' until the transients of the colour part and black and white part of the test pattern are at the same position.

Lum. Delay Secam: Apply a SECAM colour bar/greyscale pattern as a test signal. Adjust 'Lum. Delay Pal' until the transients of the colour part and black and white part of the test pattern are at the same position.

Lum. Delay Bypass: Apply a NTSC colour bar/greyscale pattern as a test signal. Adjust 'Lum. Delay Bypass' until the transients of the colour part and black and white part of the test pattern are at the same position.

'EHT compensation'

Fixed value: 0

'Soft clipper'

Fixed setting: 'Pwl+0%'

'Luma gain'

Fixed value:

'IF AFC'

See chapter 8.4.1. The SAM-mode is needed to make alignment, a test generator to make signal, an oscilloscope to measure at scart-output and the Install-menu to check finetuning-value

'Tuner AGC'

See chapter 8.4.2. The SAM-mode is needed to make alignment, a test generator to make signal, a DC-Voltmeter to measure at pin 1 of Tuner.

8.5.3 Geometry alignments 'Normal Geometry' in the Service Alignment Menu

Vertical amplitude and centring

Select 'Test Pattern on'

Set the begin conditions for 4:3 sets (25", 28" and 29"):

- Vertical S-correction value on 13 for 29"-set and on 19 for the 25"- and 28"-sets.

The boundary-stripes of the test pattern should be positioned on the edge of the picture tube.

Set the begin conditions for 16:9 sets (24", 28", 32"):

- Vertical S-correction value on 7 for 24"-set, on 8 for the 28" and on 7 for the 32"-set.

The boundary-stripes of the test pattern should be positioned on the edge of the picture tube.

1. Align 'Vslope' (when aligning the below half of the picture is blanked). The middle line of the test pattern must be matched with the edge of this blanking/picture transient in the middle of the picture. Pushing > button again, gives you previous menu again. (This alignment is meant to align the zero-crossing of the frame-deflection to the mechanical middle of the picture tube)
2. Align the vertical amplitude using 'V amplitude' so that the test pattern is fully visible.
3. Align the vertical centring using 'V shift' so that the test pattern is located vertically in the middle.
4. If necessary repeat the alignment of 'V amplitude', in order to get 'V shift' OK.

Vertical S correction

Select 'Test pattern on'.

Align the vertical S correction using 'V S-correction' so that the vertical amplitude at the top of the picture is equal to the amplitude in the middle of the picture.

Horizontal centring and amplitude

Select 'Test pattern on'.

1. Using 'H amplitude' align the horizontal amplitude so that the entire test pattern is visible.
2. Use an external test signal, with a centre-reference from a service-generator. Use 'H shift' to align the picture horizontally in the middle.
3. Repeat the 'H amplitude' alignment if necessary.

East/west alignment

Select 'Test pattern on'.

1. Use 'East/West Parabola' to align the vertical lines until straight.
2. Use 'East/West Corner' to align the vertical lines in the corners until straight.
3. Use 'East/West Trapezium' to align for a rectangular
4. Use 'Horizontal Parallelogram' to align for straight vertical lines if necessary.
5. If necessary select 'East/West Corner' and align as required.
6. Repeat steps 1 to 4 if necessary.

8.5.4 Geometry alignments 'Super wide geometry' in the Service Alignment Menu

Only applicable to 16:9 sets

The header of this paragraph and also the menu's are misleading.

We only need to set the following values, if the normal geometry alignment has been performed correctly.

Vertical S correction: enter the value of normal geometry.

Horizontal amplitude: enter the value of normal geometry subtracted by 4.

East/west parabola: enter the value of normal geometry.

8.6 Option menu

Introduction

The microprocessor communicates with a large number of I²C-ICs in the set. To ensure good communication and make digital diagnosis possible, the microprocessor has to know which ICs have to be addressed. The presence of specific ICs or functions is made known by means of the option codes.

All options codes can be manipulated using both the option numbers and/or the Option menu.

All hardware related options are incorporated under the heading 'Options' of the 'Alignments' sub-menu of the 'Service Alignment Mode'.

All software related options that are incorporated under the heading 'Dealer Options' of the 'Service Alignment Mode', can also be reached directly via the <dealer>-button of the DST.

8.7 Dealer Options in the Service Alignment Mode

Menu-item	Subjects	Options	Physically in the set
Teletext	TXT	Yes	Teletext software feature on
		No	Teletext software feature off
Communication	Easylink	Yes	Project 50 (easylink) set
		No	No project 50 (easylink) set
Picture tube	CRT Type	4:3	4:3 picture tube
		16:9	16:9 picture tube
	only for 1 6:9: Picture Rotation	Yes	Frame rotation circuitry present on LSP (IC7440 diagram A3)
		No	Frame rotation circuitry not present on LSP (IC7440 diagram A3)
Video Repro Options	Feature box type	100Hz	IC7606 present on SSP (diagram K5)
		Digital Scan	IC7606 and IC7607 present on SSP (diagram K5)
	Combfilter	Yes	IC7560 present on SSP (diagram K1)
		No	IC7560 not present on SSP (diagram K1)
	Picnic AGC	Yes	In normal operation: Yes
		No	During 'Drive' alignments: No
	TXT Dualscreen	Yes	TXT DualScreen software feature on
		No	TXT DualScreen software feature off
	EPG Dualscreen	Yes	IC7013 present on the SSP (diagram K7)
		No	IC7013 not present on the SSP (diagram K7)
Source Selection	External 3	Yes	3rd EURO connector present
		No	No 3rd EURO connector present
Audio Repro	Acoustic system	Normal	Applicable for sets without subwoofer
		Enhanced	Applicable for sets with subwoofer
Miscellaneous	NextView	Yes	NextView present
		No	Nextview not present
	Heatsink Present	Yes	Heatsinks present on CRT/Scavem panel (diagram F)
		No	Heatsinks not present on CRT/Scavem panel (diagram F)

After the option(s) have been changed, they must be stored via the STORE command.

The new option is only active after the TV is switched off and then back on again using the mains switch (the EAROM is then read out again).

8.8 'Option number'

In case the EAROM has to be replaced, all the options will also require resetting. To be certain that the factory settings are reproduced exactly, both option numbers have to be set. These numbers can be found on a sticker on the picture tube.

Example: option number of 29PT8304/12 is:

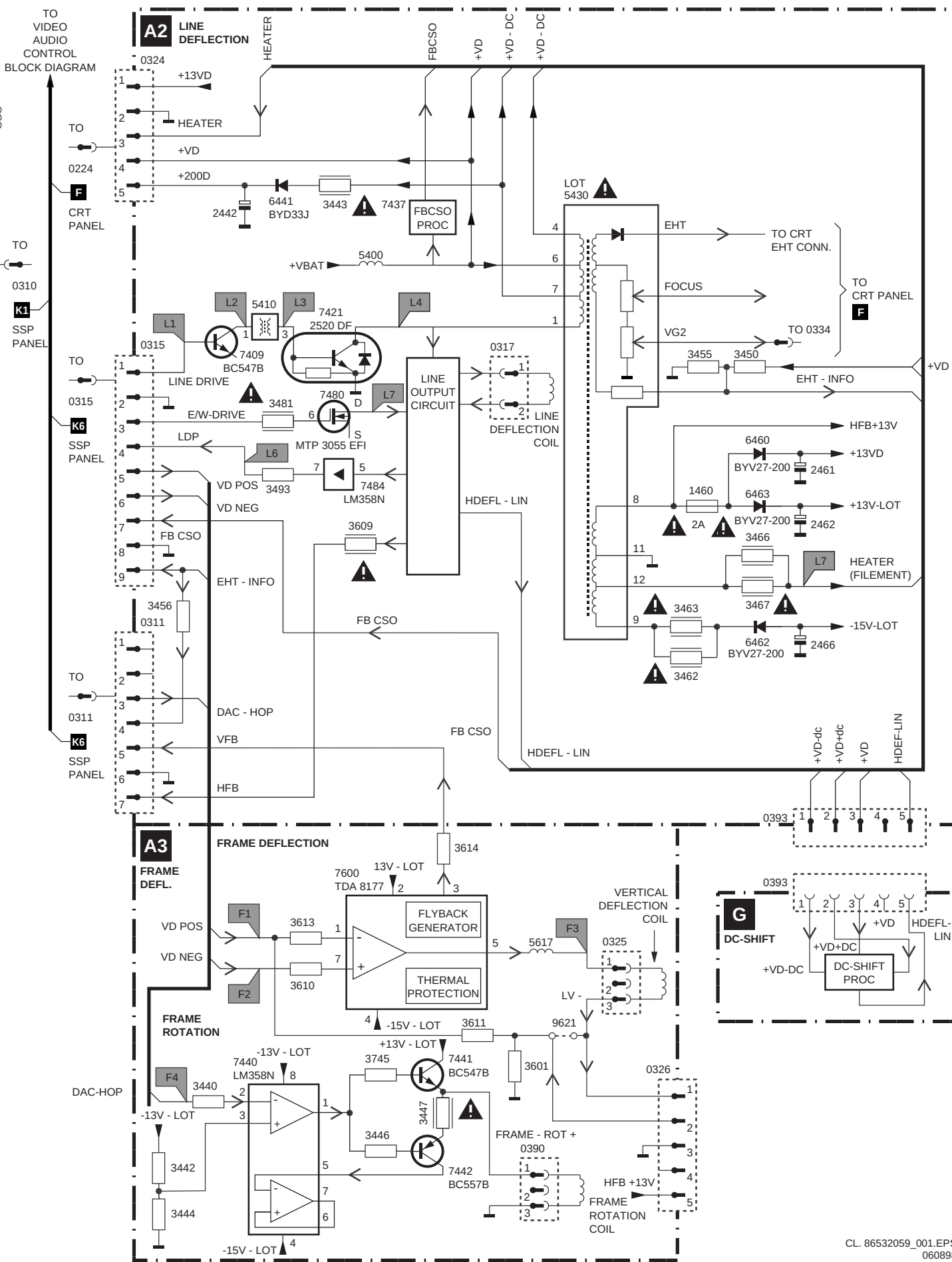
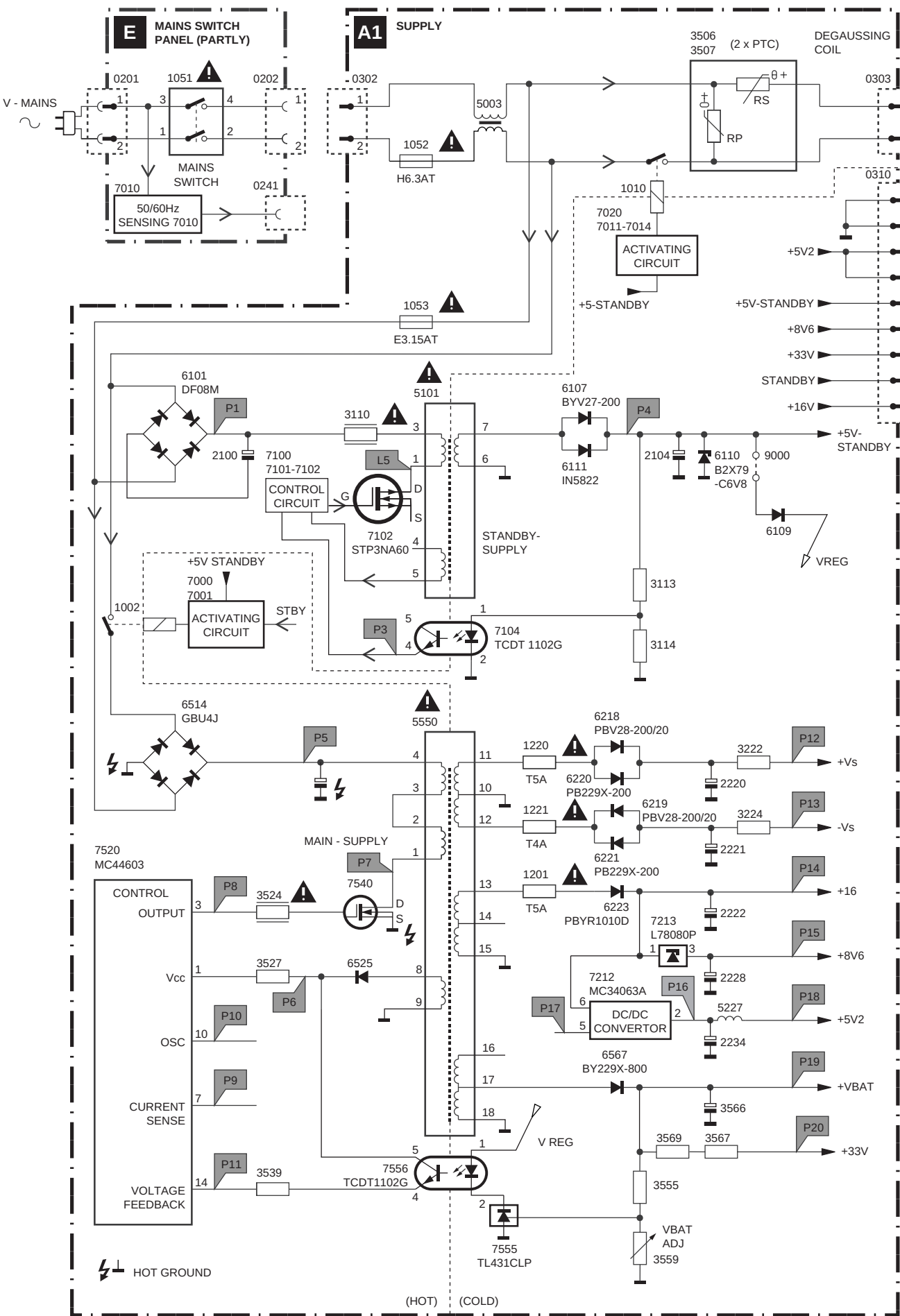
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04134 00001 00000 00000

6 Block diagrams

MG2.1E

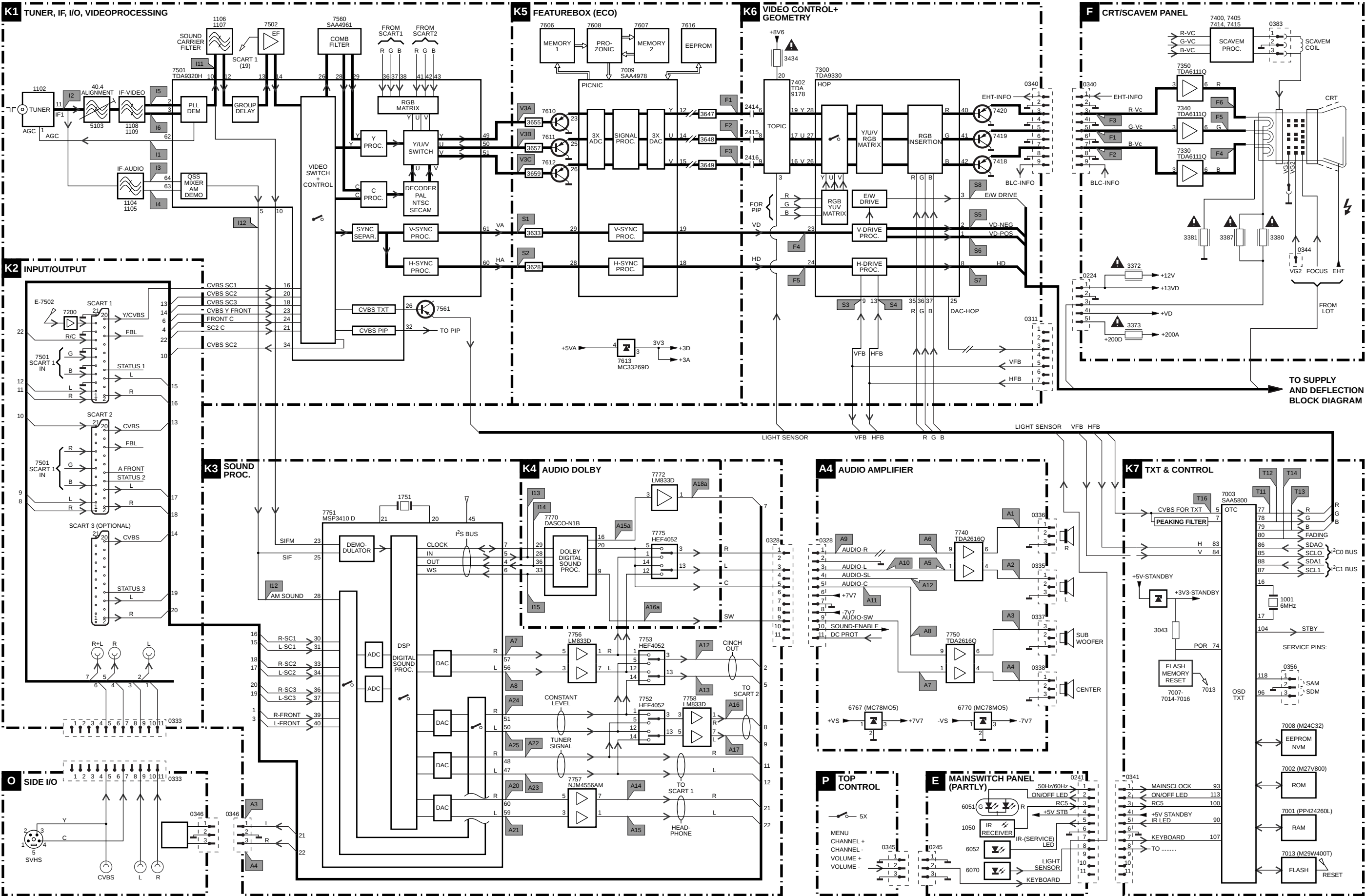
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6 Block diagrams

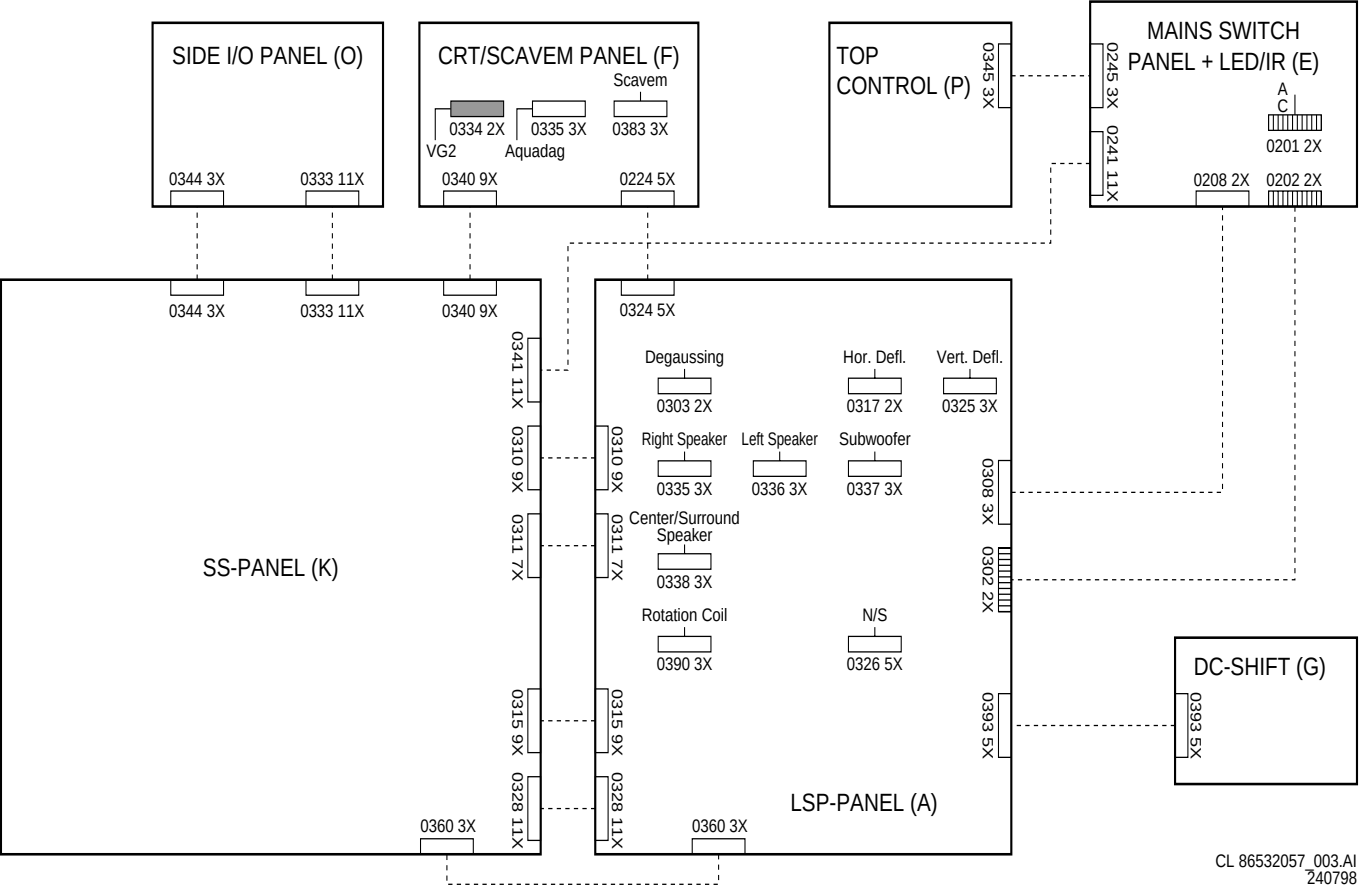
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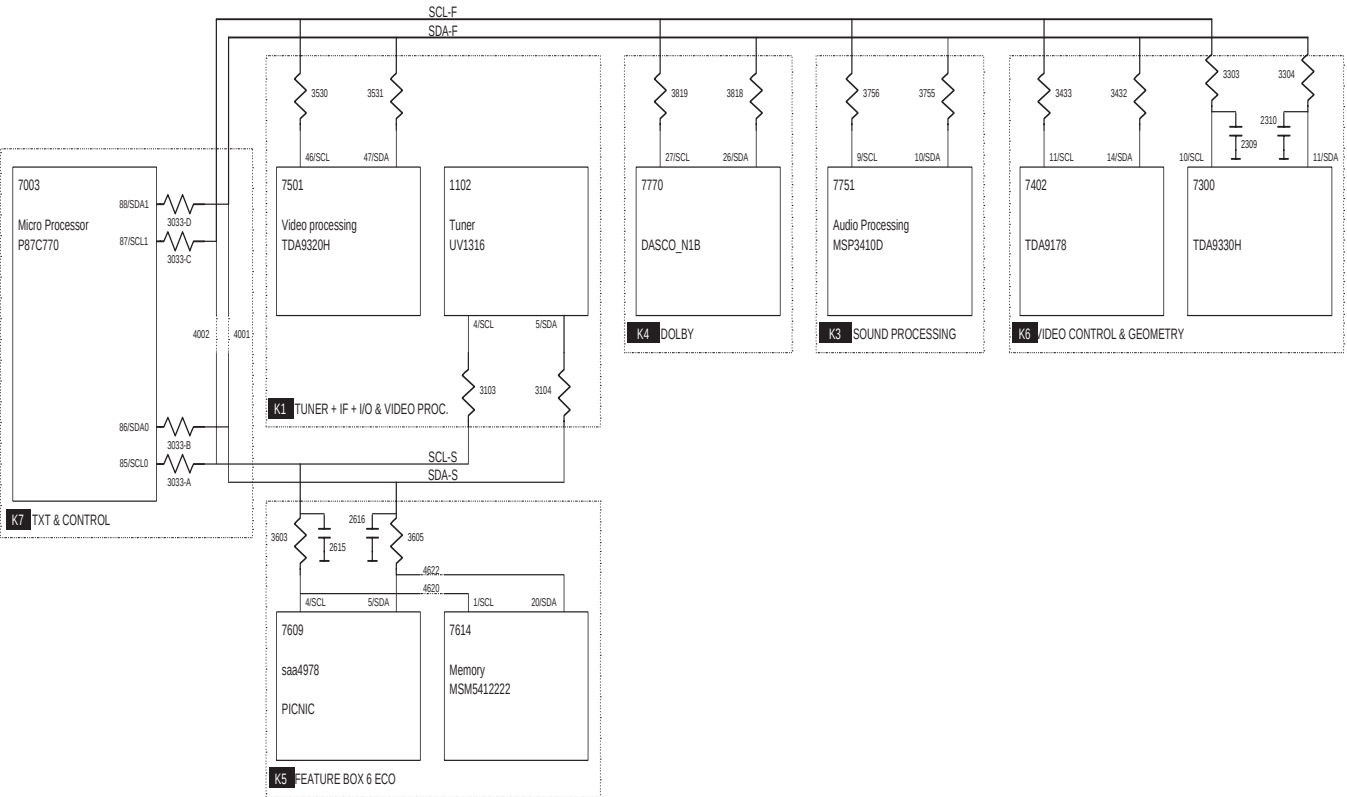


6 Block diagrams

WIRING DIAGRAM MG2.1 E



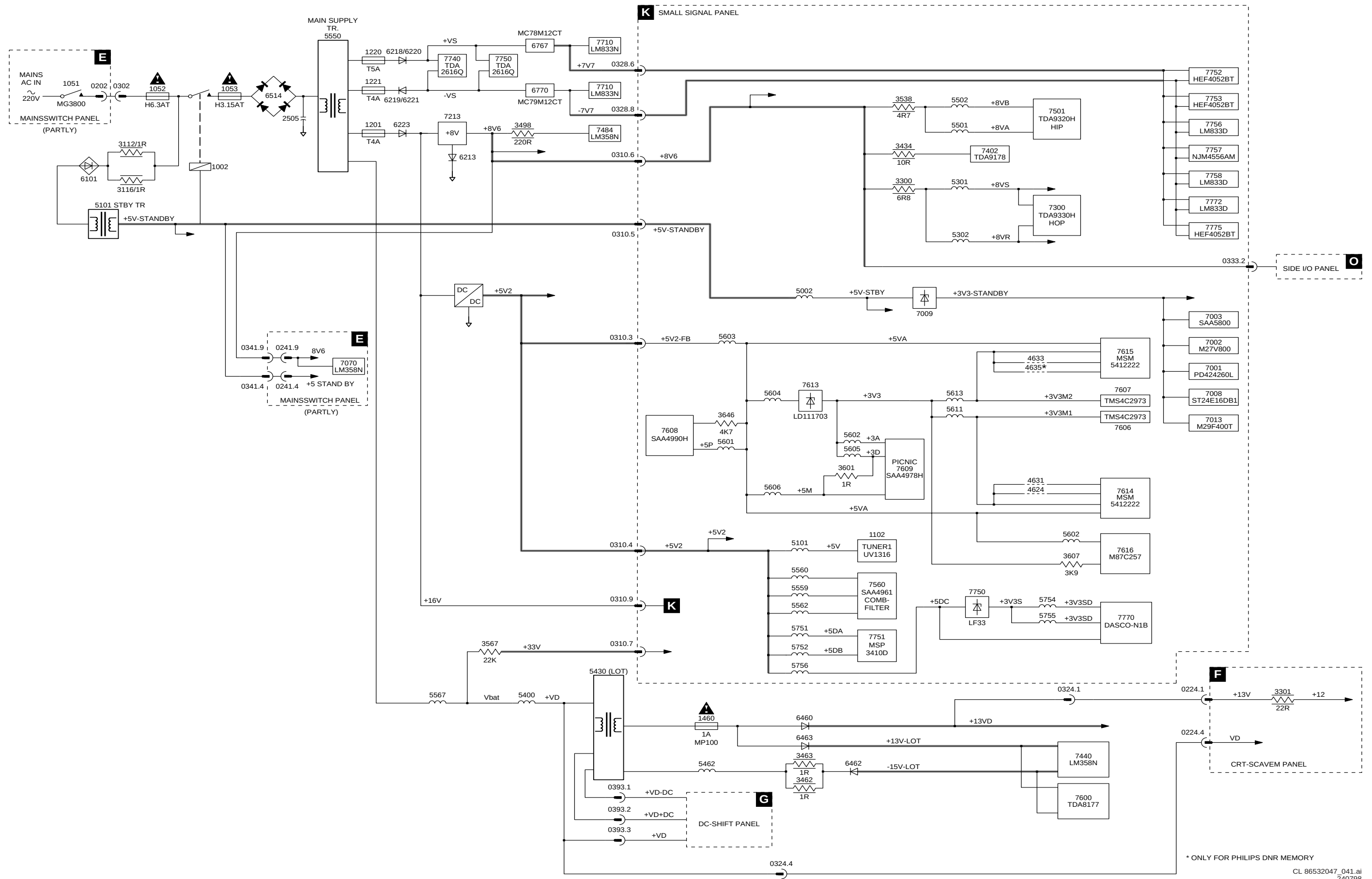
Overview I²C-ICs



6 Block diagrams

MG2.1E 34

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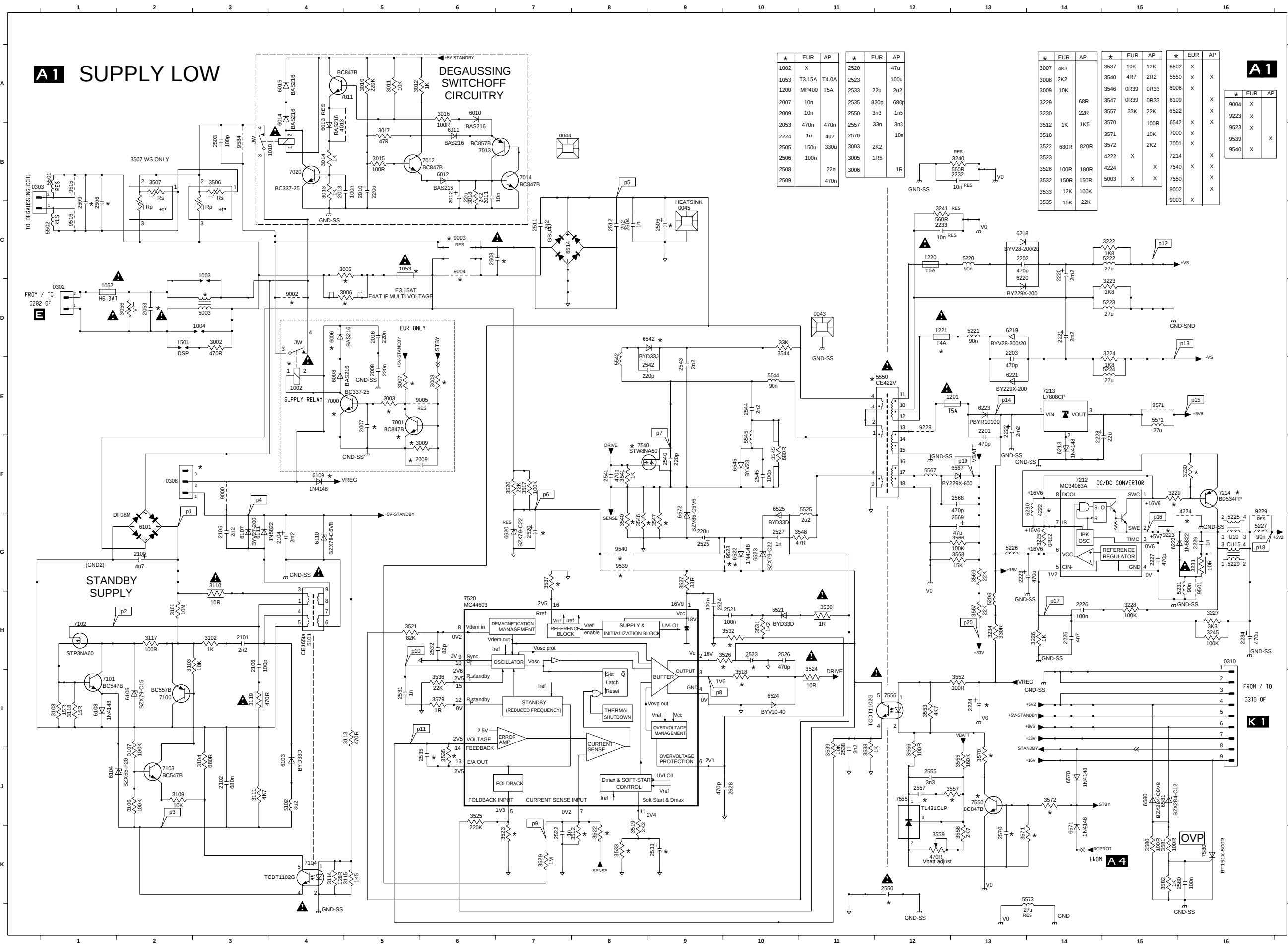
* ONLY FOR PHILIPS DNR MEMORY

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7 Electrical diagrams and print lay-outs

MG2.1E

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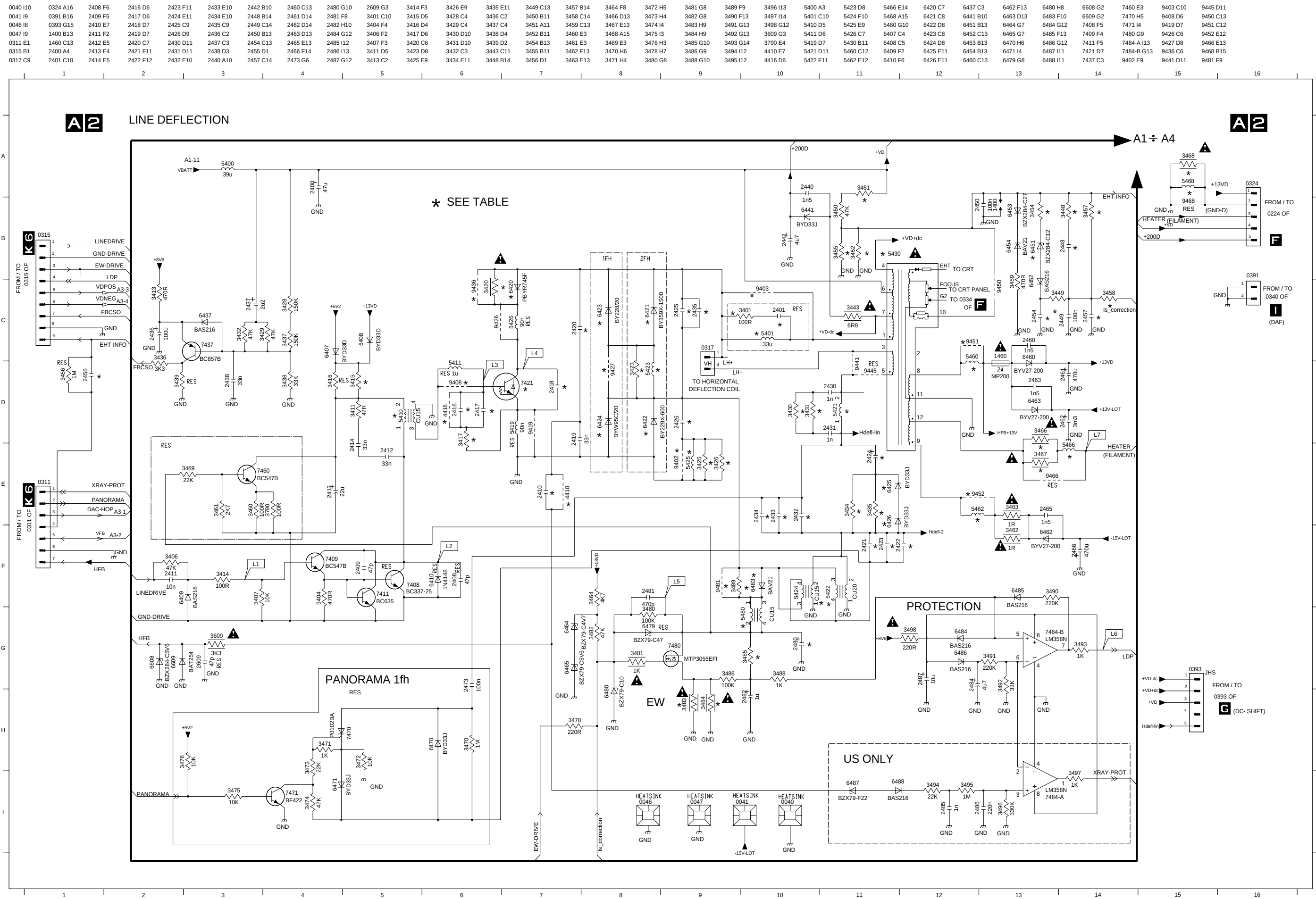


0043 D11	3114 K4	6110 G4
0044 B7	3115 K5	6111 G3
0045 C9	3117 H2	6213 F14
0302 D1	3118 I1	6218 C13
0303 B1	3119 I3	6219 D13
0308 F2	3222 C15	6220 D13
0310 H16	3223 D15	6221 E13
1002 E4	3224 D15	6222 G15
1003 C3	3225 G14	6223 E15
1004 D3	3226 H14	6514 C7
1010 B4	3227 H16	6520 G7
1052 D1	3228 H15	6521 H10
1053 C5	3229 F15	6522 G10
1201 E13	3230 F16	6523 G10
1220 C12	3231 G16	6524 I10
1221 D12	3234 H13	6525 F10
1501 D2	3240 B13	6542 D9
2006 D5	3241 C12	6545 F10
2007 E5	3242 H16	6567 F13
2008 E5	3506 B3	6570 J14
2009 F6	3507 B2	6571 K14
2010 B5	3512 K8	6572 F9
2011 B6	3517 F7	6580 J15
2012 B6	3518 I10	6581 J15
2013 B4	3519 K8	7000 E4
2053 D2	3520 F7	7001 E5
2100 G2	3521 H5	7011 A5
2101 H3	3522 K8	7012 B6
2102 J3	3523 K7	7013 B6
2104 G4	3524 I11	7014 B7
2105 G3	3525 J6	7020 B4
2106 H3	3526 H10	7100 I2
2201 E13	3527 G9	7101 I1
2202 C13	3528 K7	7102 H1
2203 D13	3530 H11	7103 J2
2220 C14	3531 H10	7104 K4
2221 D14	3532 H10	7212 F14
2222 E13	3533 K8	7213 E14
2223 G13	3535 J6	7214 F16
2224 I13	3536 I6	7520 H6
2225 H14	3537 G7	7540 F8
2226 H14	3538 J11	7550 J13
2227 G15	3539 J11	7555 J12
2228 F14	3540 G8	7556 I12
2229 G16	3541 F8	7580 K16
2232 B13	3544 D10	9000 F3
2233 C12	3545 F10	9002 D4
2234 H16	3546 G8	9003 C6
2503 B3	3547 G9	9004 C6
2504 C8	3548 G11	9005 E6
2505 C9	3552 I13	9223 G15
2506 C1	3553 I12	9228 E12
2508 C6	3555 J13	9229 G16
2509 C1	3556 J12	9501 B1
2511 C7	3557 J13	9515 B1
2512 C8	3558 K12	9516 C1
2520 G7	3559 K12	9523 G10
2521 H10	3566 G13	9539 G8
2522 K7	3567 H13	9540 G8
2523 H10	3568 G13	9571 E15
2524 H9	3569 G13	9584 B3
2525 G9	3570 J13	
2526 H10	3571 K13	
2527 G10	3572 J14	
2528 J10	3573 I6	
2531 I5	3580 K15	
2532 H6	3581 K15	
2533 K9	3582 K15	
2535 J6	4013 B4	
2538 J11	4222 F14	
2540 F9	4224 G16	
2541 F8	5003 D3	
2542 E9	5101 H4	
2543 E9	5102 J4	
2544 E10	5205 H13	
2545 F10	5220 C13	
2550 K12	5221 D13	
2555 J12	5222 C15	
2557 J12	5223 D15	
2568 F13	5224 E15	
2569 G13	5225 G16	
2570 K13	5226 G16	
2580 K16	5227 G16	
3002 D3	5229 G16	
3003 E5	5230 F14	
3005 C5	5231 G16	
3006 D5	5501 B1	
3007 E5	5502 C1	
3008 E6	5525 F11	
3009 F6	5542 E10	
3010 A5	5544 E10	
3011 A5	5545 F10	
3012 A5	5550 E12	
3013 B4	5567 F12	
3014 B4	5571 E15	
3015 B5	5573 K14	
3016 A6	6006 D4	
3017 B5	6008 E4	
3018 B6	6010 A6	
3056 D2	6011 B6	
3101 H2	6012 B6	
3102 H3	6013 B4	
3103 H2	6014 A4	
3104 J3	6015 A4	
3106 J2	6101 G2	
3107 J2	6103 J4	
3108 I1	6104 J1	
3109 J2	6105 I2	
3110 G3	6107 G3	
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3113 I5	6109 F4	

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MG2.1E

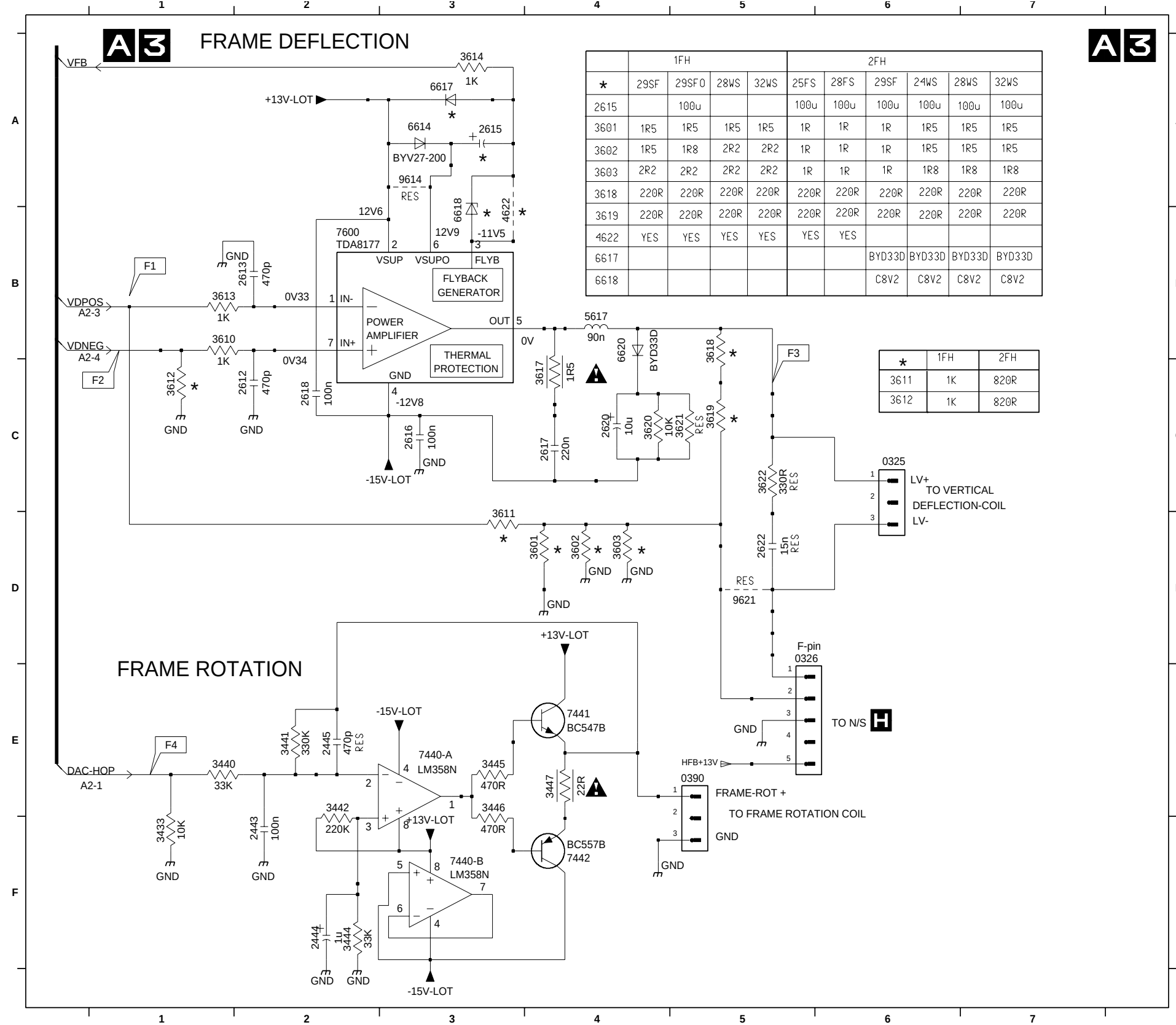
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7 Electrical diagrams and print lay-outs

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non CRT-site related			
	*	1FH	2FH
2410			4n7
2416			100n
2417			100n
2418			220p
2424		1u	
2455		1n5	
2457		47n	33n
2480		4u7	2u2
3417		47R	10R
3420			47R
3423			6R8
3425			10R
3426			10R
3430		3K3	1k
3431		3K3	1k
3434		33K	
3435		33k	
3466		4R7	1R
3468			150R
3489			33R
4410	X		
4416	X		
5410	X		X
5423			X
5425			X
5460			X
5462			X
5466	X		X
5468	X		X
5480	X		X
6420			X
6421			X
6422			X
6423	X		
6424	X		
6425	X		
6426	X		
6483			X
7421	2508AF		2520DF
9402	X		
9408	X		X
9427	X		
9436	X		
9451	X		
9452	X		
9481	X		

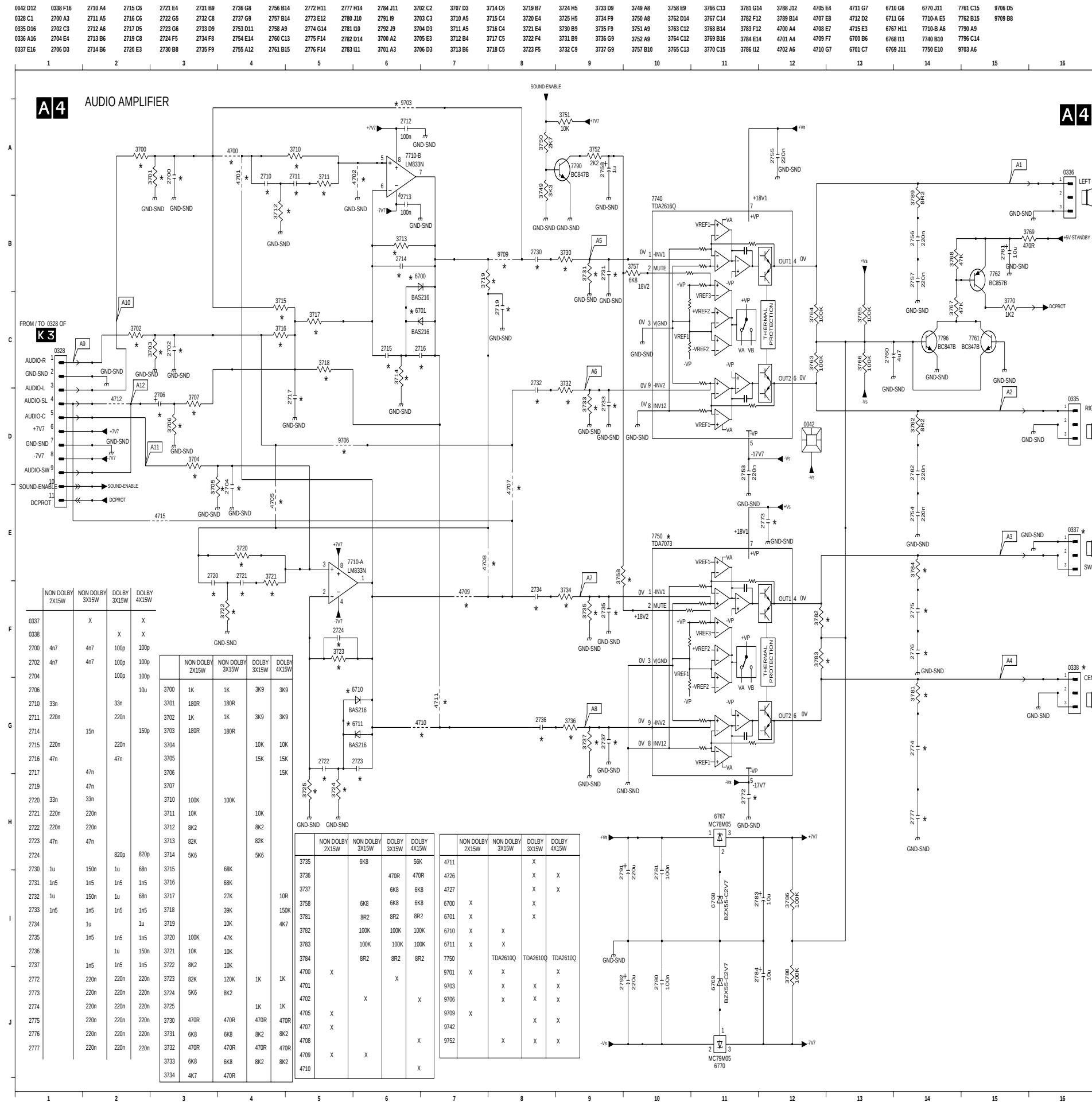


0325 C6
0326 D5
0390 E5
2443 F2
2444 F2
2445 E2
2612 C2
2613 B2
2615 A3
2616 C3
2617 C4
2618 C2
2620 C4
2622 D5
3433 F1
3440 E1
3441 E2
3442 E2
3444 F2
3445 E3
3446 E3
3447 E4
3601 D4
3602 D4
3603 D4
3610 B1
3611 D3
3612 C1
3613 B1
3614 A3
3617 C4
3618 B5
3619 C5
3620 C4
3621 C5
3622 C5
4622 B3
5617 B4
6614 A3
6617 A3
6618 B3
6620 B4
7440-A E3
7440-B F3
7441 E4
7442 F4
7600 B2
9614 A3
9621 D5

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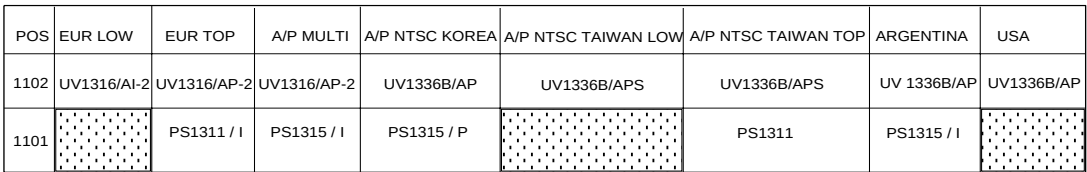
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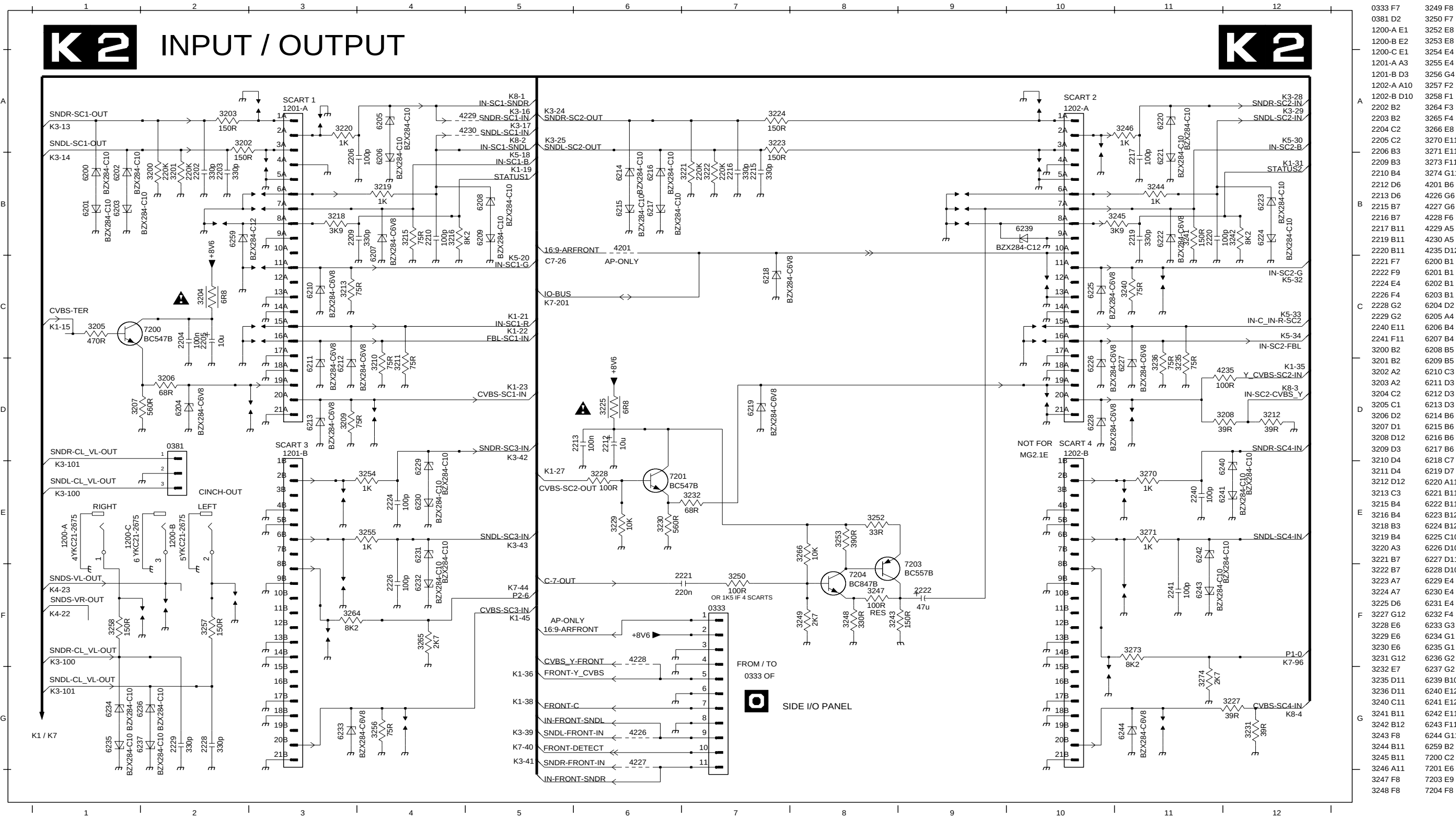


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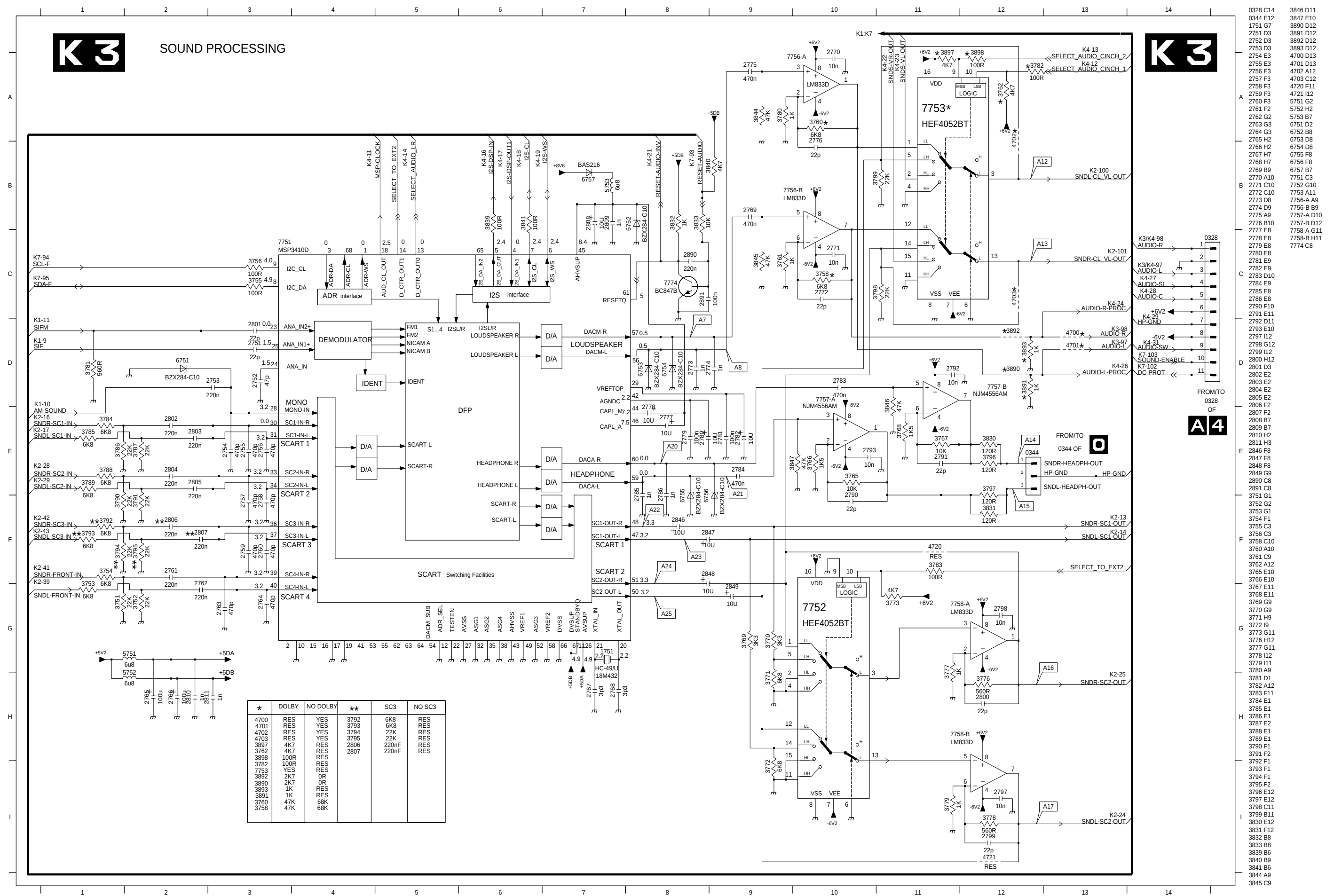




0333 F7	3249 F8
0381 D2	3250 F7
1200-A E1	3252 E8
1200-B E2	3253 E8
1200-C E1	3254 E4
1201-A A3	3255 E4
1201-B D3	3256 G4
1202-A A10	3257 F2
1202-B D10	3258 F1
2202 B2	3264 F3
2203 B2	3265 F4
2204 C2	3266 E8
2205 C2	3270 E11
2206 B3	3271 E11
2209 B3	3273 F11
2210 B4	3274 G11
2212 D6	4201 B6
2213 D6	4226 G6
2215 B7	4227 G6
2216 B7	4228 F6
2217 B11	4229 A5
2219 B11	4230 A5
2220 B11	4235 D12
2221 F7	6200 B1
2222 F9	6201 B1
2224 E4	6202 B1
2226 F4	6203 B1
2228 G2	6204 D2
2229 G2	6205 A4
2240 E11	6206 B4
2241 F11	6207 B4
3200 B2	6208 B5
3201 B2	6209 B5
3202 A2	6210 C3
3203 A2	6211 D3
3204 C2	6212 D3
3205 C1	6213 D3
3206 D2	6214 B6
3207 D1	6215 B6
3208 D12	6216 B6
3209 D3	6217 B6
3210 D4	6218 C7
3211 D4	6219 D7
3212 D12	6220 A11
3213 C3	6221 B11
3215 B4	6222 B11
3216 B4	6223 B12
3218 B3	6224 B12
3219 B4	6225 C10
3220 A3	6226 D10
3221 B7	6227 D11
3222 B7	6228 D10
3223 A7	6229 E4
3224 A7	6230 E4
3225 D6	6231 E4
3227 G12	6232 F4
3228 E6	6233 G3
3229 E6	6234 G1
3230 E6	6235 G1
3231 G12	6236 G2
3232 E7	6237 G2
3235 D11	6239 B10
3236 D11	6240 E12
3240 C11	6241 E12
3241 B11	6242 E11
3242 B12	6243 F11
3243 F8	6244 G11
3244 B11	6259 B2
3245 B11	7200 C2
3246 A11	7201 E6
3247 F8	7203 E9
3248 F8	7204 F8

LOW			TOP	
PinName	100Hz ECO Eur	50Hz Eur	100Hz TOP/MED Eur	100Hz AP
P1-0			STATUS4	MAINS CLOCK
P1-4	I/O_CNTRL_BUS IN	I/O_CNTRL_BUS IN	I/O_CNTRL_BUS IN	16:9 ARFRONT
P2-6		STATUS3	STATUS3	
P3-7	I/O_CNTRL_BUS OUT	I/O_CNTRL_BUS OUT	I/O_CNTRL_BUS OUT	

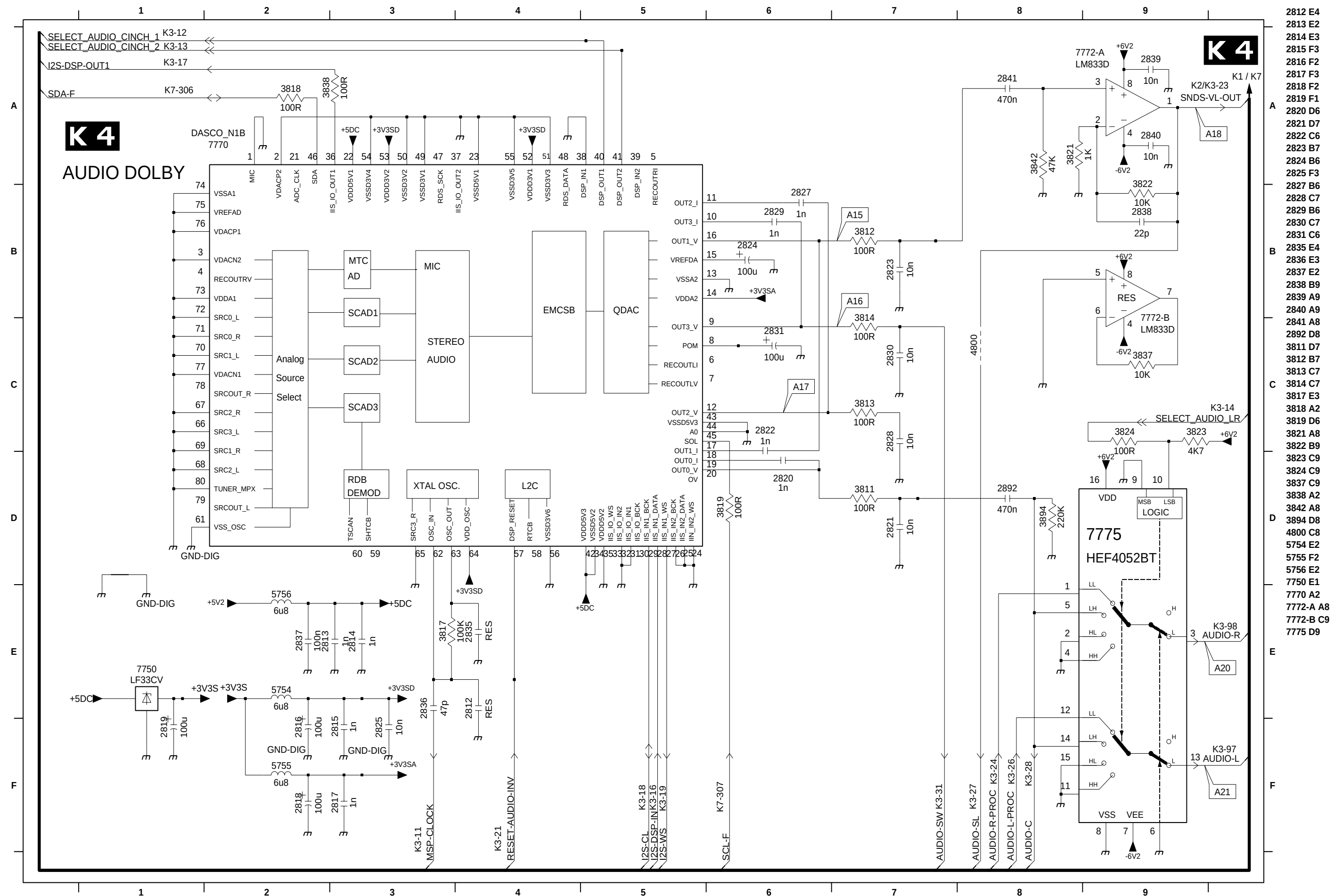
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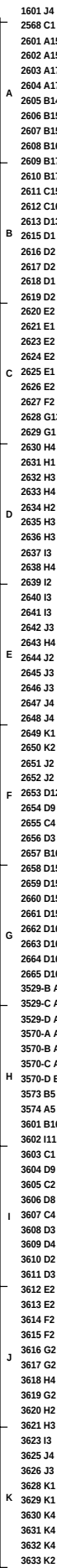
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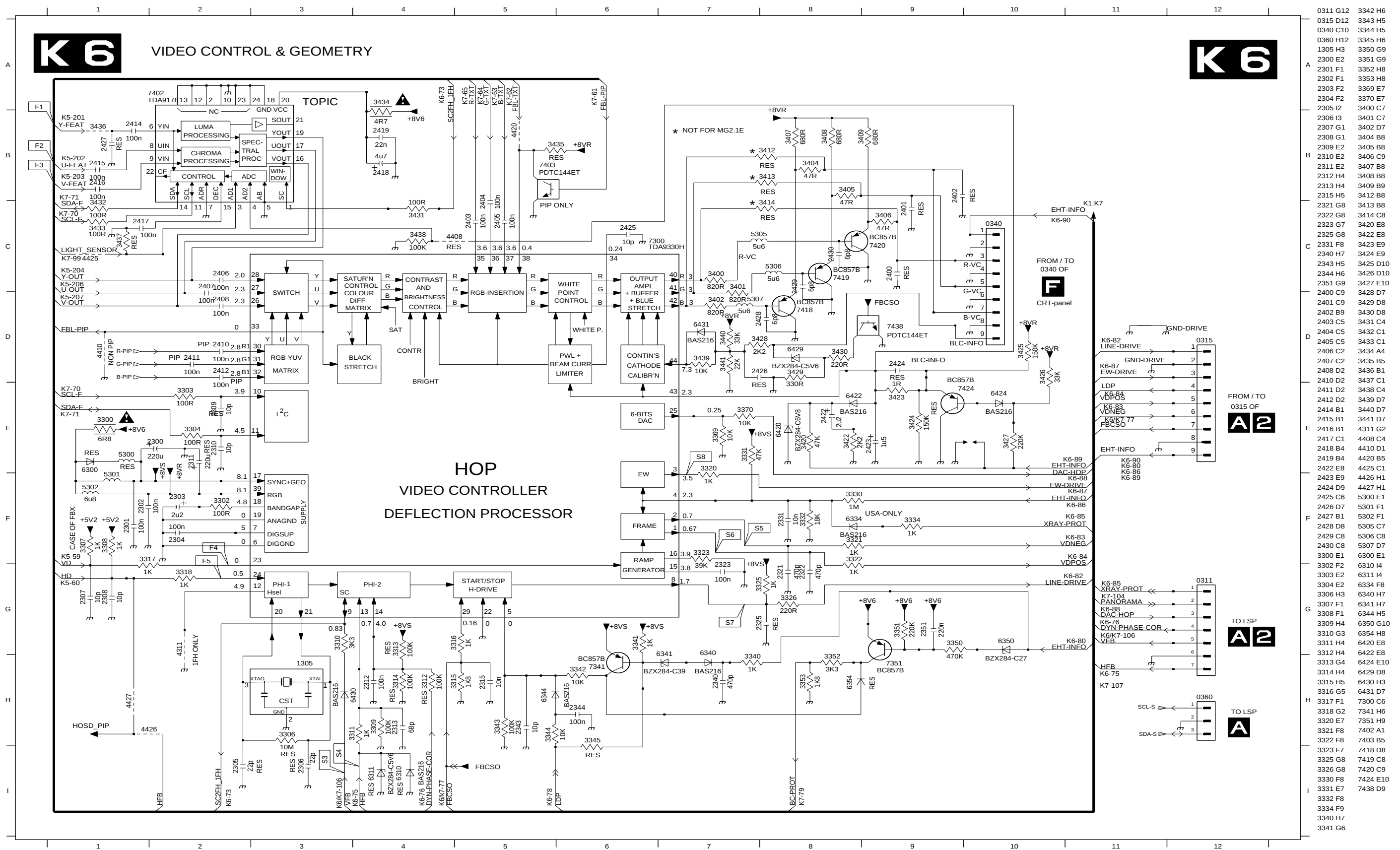
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LOW

[TOP](#)

PinName	100Hz ECO Eur	50Hz Eur	1FH AP/US	100Hz TOP/MED Eur	100Hz AP/US
P2-7			RESET GEMSTAR	RGB1FH/FRONT UI	H SEL

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